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FIELD EVALUATION OF LOW-EMISSION COAL BURNER TECHNOLOGY ON UTILITY BOILERS

VOLUME III
Field Evaluations

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16. ABSTRACT The report gives results of field tests conducted to determine the emission characteristics of a Babcock and Wilcox Circular burner and Dual Register burner (DRB). The field tests were performed at two utility boilers, generally comparable in design and size except for the burner equipment. The Circular burner was evaluated at Unit 2 of the Colorado Public Services Comanche Generating Station, and the DRB was evaluated at Unit 1 of the Wyodak Generating Station of the Pacific Power and Light Company and the Black Hills Power and Light Company. Of particular interest was the development of NOx emission correlations for the performance of Circular burners and DRBs under boiler conditions which could be used in interpreting individual burner tests in a subscale burner test facility. The field tests were conducted with both boilers operating at nominal full-load conditions. During each test, boiler performance and operating conditions were monitored using plant equipment, while gaseous emissions of NOx, O2, CO, SO2, and CO2 were continuously monitored using a mobile test trailer. The nominal NOx emissions with the Circular burner at Comanche were 550 ppm at 0% O2. Full-load NOx emissions at Wyodak with all mills in service were 395 ppm at 0% O2. Operation over a narrow excess O2 range precluded establishing NOx emission as a function of excess O2.

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Coal	Electric Utilities	Stationary Sources	21D	
Combustion		Circular Burners	21B	
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ABSTRACT

This report describes the results of field tests conducted to determine the emission characteristics of B&W circular and dual register burners. The field tests were performed at two different utility boilers, generally comparable in design and size except for the burner equipment. The B&W circular burner was evaluated at Unit 2 of the Colorado Public Services Comanche Generating Station and the B&W dual register burner was evaluated at Unit 1 of the Wyodak Generating Station of the Pacific Power and Light Company and the Black Hills Power and Light Company. Of particular interest was the development of NO_x emission correlations for the performance of circular and dual register burners under boiler conditions which could be used in interpretation of individual burner tests in a subscale burner test facility. The field tests were conducted with both boilers operating at nominal full-load conditions. During each test, boiler performance and operating conditions were monitored using plant equipment, while gaseous emissions of NO_x, O_2, CO, SO_2, and CO_2 were continuously monitored using a mobile test trailer. The nominal NO_x emissions with the circular burner at Comanche were 550 ppm at 0 percent O_2. Full-load NO_x emissions at Wyodak with all mills in service were 395 ppm at 0 percent O_2.

Since both boilers were operated over a narrow excess O_2 range, the data were not sufficient to establish NO_x emission as a function of excess O_2. However, the data from both boilers do show a strong dependence of NO_x on both boiler load and firing configuration.

This work was carried out by Energy and Environmental Research Corporation under EPA Contract 68-02-3130, through Babcock and Wilcox Subcontract 940962 NR.

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1.0 INTRODUCTION

Field evaluations to determine the emission characteristics of Babcock & Wilcox (B&W) circular and dual register burners were conducted by Energy and Environmental Research (EER) Corporation. These evaluations were part of a burner development program conducted by B&W and EER for the U.S. EPA. This burner development program involved the integration of the EPA distributed mixing burner concept with commercial B&W hardware. The performance and emissions of the distributed mixing burner were evaluated in the Large Watertube Simulator, a full-scale burner test facility. B&W circular and dual register burners were also evaluated in the LWS. The objective of the field evaluation was to develop a correlation between the test results of the circular and dual register burners in the LWS and in the utility boilers. This correlation could then be used to extrapolate the performance and emissions of the distributed mixing burner to a large scale utility application.

Field testing was conducted at two boilers, one equipped with the circular burner and one with the dual register burner. The boilers were selected by B&W to be comparable in terms of age, capacity, coal characteristics, and firing configuration. The circular burner was evaluated at the Colorado Public Service Comanche Generating Station, Unit 2 located in Pueblo, Colorado. The dual register burner was tested at the Wyodak Generating Station, Gillette, Wyoming, owned by Pacific Power and Light Company and the Black Hills Power and Light Company. Testing was conducted for one week at Comanche in December 1984 and for two weeks at Wyodak in February 1985.

Section 2.0 presents a summary of the field test results. The boilers and test plan are described in Section 3.0. Detailed results are included in Section 4.0. The appendices include test procedures, data, and quality assurance.

2.0 SUMMARY

Table 2-1 shows the characteristics of the two boilers tested. Both boilers fire subbituminous coal and use a front and rear wall firing configuration. The front and rear wall burners at the Comanche boiler are directly opposed with four rows of four burners each. The front and rear wall burners at Wyodak are offset to avoid flame interactions and are arranged in five rows of three burners each. The boilers have comparable furnace cross-sectional dimensions, but the Wyodak boiler has a taller furnace to accommodate the five burner rows. Thus, the Wyodak furnace has a lower ratio of firing rate to cooled surface area (HA/SC).

During testing, the boilers were generally operated in a normal fashion by the operators without interference from EER. Thus, the burner settings, load, and excess air were controlled by plant personnel. The overfire air NO_x ports were closed during the day at the Comanche boiler at the request of EER, and returned to their normal open position of 18 percent at night. Table 2-2 shows the typical burner settings and flame characteristics during the tests. Both the circular and dual register burners operated satisfactorily during the tests. Exact flame lengths could not be determined with the available observation ports. Both burners showed a high combustion efficiency and large imbalances of fuel or air distribution were not observed.

Both boilers operated over a narrow excess O_2 range, 2.5 to 3.5 percent at Comanche and 3.8 to 4.0 percent at Wyodak. Thus, the data were not sufficient to establish NO_x emissions as a function of excess O_2. Figure 2-1 shows NO_x emissions at the two boilers as a function of load. Both correlations show a similar slope, with lower emissions for the dual register burner at Wyodak. Nominal NO_x emissions with the circular burner at Comanche were 550 ppm at 0 percent O_2 (0.64 lbs/10^6 Btu). Full load emissions at Wyodak with all mills in service were 395 ppm at 0 percent O_2 (0.46 lbs/10^6 Btu). More detailed test data are presented in Section 4.0.

TABLE 2-1. BOILER DESCRIPTIONS

UNIT	COMANCHE UNIT 2	WYODAK UNIT 1
UTILITY	COLORADO PUBLIC SERVICE	PACIFIC POWER & LIGHT BLACK HILLS POWER & LIGHT
BOILER MANUFACTURER	B&W	B&W
YEAR OF INITIAL OPERATION	1976	1978
GROSS GENERATING CAPACITY	350 MW_E	350 MW_E
TYPE OF BURNER	B&W CIRCULAR	B&W DUAL REGISTER
NO. OF BURNERS	32	30
NO. OF MILLS	4	5
BURNER ARRANGEMENT	4W x 4H ON FRONT & REAR WALLS	3W x 5H ON FRONT & REAR WALLS
FURNACE DIMENSIONS	43'W x 45'D x 161'H	46'W x 45'D x 180'H
COAL TYPE	SUB BITUMINOUS	SUB BITUMINOUS
ADDITIONAL FEATURES	8 NO_X PORTS	SEALED NO_X PORTS OPPOSING BURNERS OFFSET
	COMPARTMENTED WINDBOXES	

TABLE 2-2. BURNER OPERATING CHARACTERISTICS

UNIT	COMANCHE	WYODAK
BURNER TYPE	CIRCULAR	DUAL REGISTER
TYPICAL BURNER SETTINGS	BOTTOM BURNERS-REGISTERS 50% OPEN TOP BURNERS -REGISTERS 100% OPEN	OUTER REGISTERS 50% OPEN INNER REGISTERS 25-50% OPEN SWIRL VANES 45% OPEN
FLAME CHARACTERISTICS	LONG AND NARROW 0-2 FT STANDOFF	LONG AND NARROW 35 - 44 FT LONG 0.5-3 FT STANDOFF

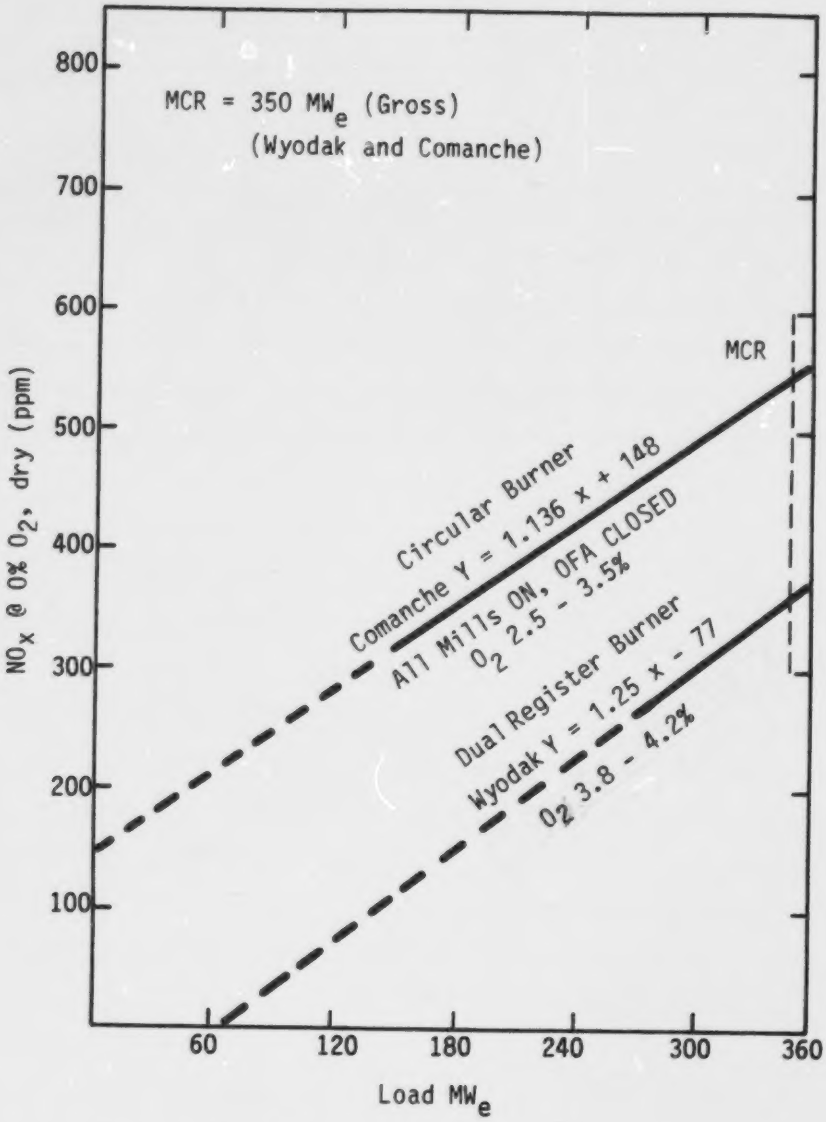


Figure 2-1. NO_x emissions vs. boiler load.

3.0 BOILER DESCRIPTIONS AND TEST PLAN

Characteristics of the Comanche boiler are included in Section 3.1. The Wyodak boiler is described in Section 3.2. The Test Plan for the evaluation of both boilers is described in Section 3.3.

3.1 Description of Comanche Unit 2

Comanche Unit 2 is a horizontally opposed wall fired balanced draft utility boiler manufactured by Babcock & Wilcox. The boiler is located via Pueblo, Colorado and is operated by Public Service Company of Colorado. It has a maximum continuous operating capacity of 350 MW_e with a steam flowrate of 2.54×10^6 lbs/hr at 1005°F and 2500 psig from the superheater. The reheater outlet temperature and pressure are 1005°F and 555 psig. The boiler fires a subbituminous coal with a higher heating value of 8400 Btu/lb and a moisture content of 31 percent by weight as received. The coal sulfur content is approximately 0.4 percent by weight as received. The characteristics of the boiler are summarized in Table 3-1.

The coal for the boiler is ground in four pulverizers designated A, B, C and D. Each mill feeds eight burners. The burners are arranged in four rows of four burners each on two boiler walls. The unit is equipped with eight overfire air ports for NO_x control. A single port is located over each of the top row burners. Secondary air is fed through three compartmentalized windboxes. One windbox feeds all the burners located in the lower two rows. Another feeds all burners in the upper two rows and a third windbox feeds all of the overfire air ports.

The burners used on the unit are B&W high turbulence circular burners. These are the standard burners used on B&W pre-NSPS (New Source Performance Standards) units. Figure 3-1 shows the circular burner. Coal is supplied through a central coal nozzle. The coal is dispersed into the furnace by an impeller on the end of the coal nozzle. Secondary air flowrate and swirl to each burner are controlled by a single register. Figure 3-2 shows the burner settings during testing. These settings are normally not changed. Burners

TABLE 3-1. COMANCHE PLANT UNIT 2 BOILER SPECIFICATIONS

Manufacturer	Babcock & Wilcox
Year in Commercial Operation	1971
Gross Electrical Capacity	350 MW_e
Fuel	Pulverized Coal Subbituminous
Burners	
Type	B&W Circular
Number	32
Configuration	Horizontal, Opposed-Fired
Array	4 Rows of 4 Burners on Front and Rear Walls
Number of Pulverizers	4
Furnace Dimensions	
Width	43 ft
Depth	45 ft
Height	174 ft
Design Efficiency	84.57% at Maximum Continuous Rating
Steam Flowrate	2,540,000 lb/hr at Maximum Continuous Rating
Steam Pressure	2500 psig
Superheat Temperature	1005°F
Reheat Temperature	1005°F
HA/SC	
Design	384×10^3 Btu/hr-ft^2
Field	400×10^3 Btu/hr-ft^2

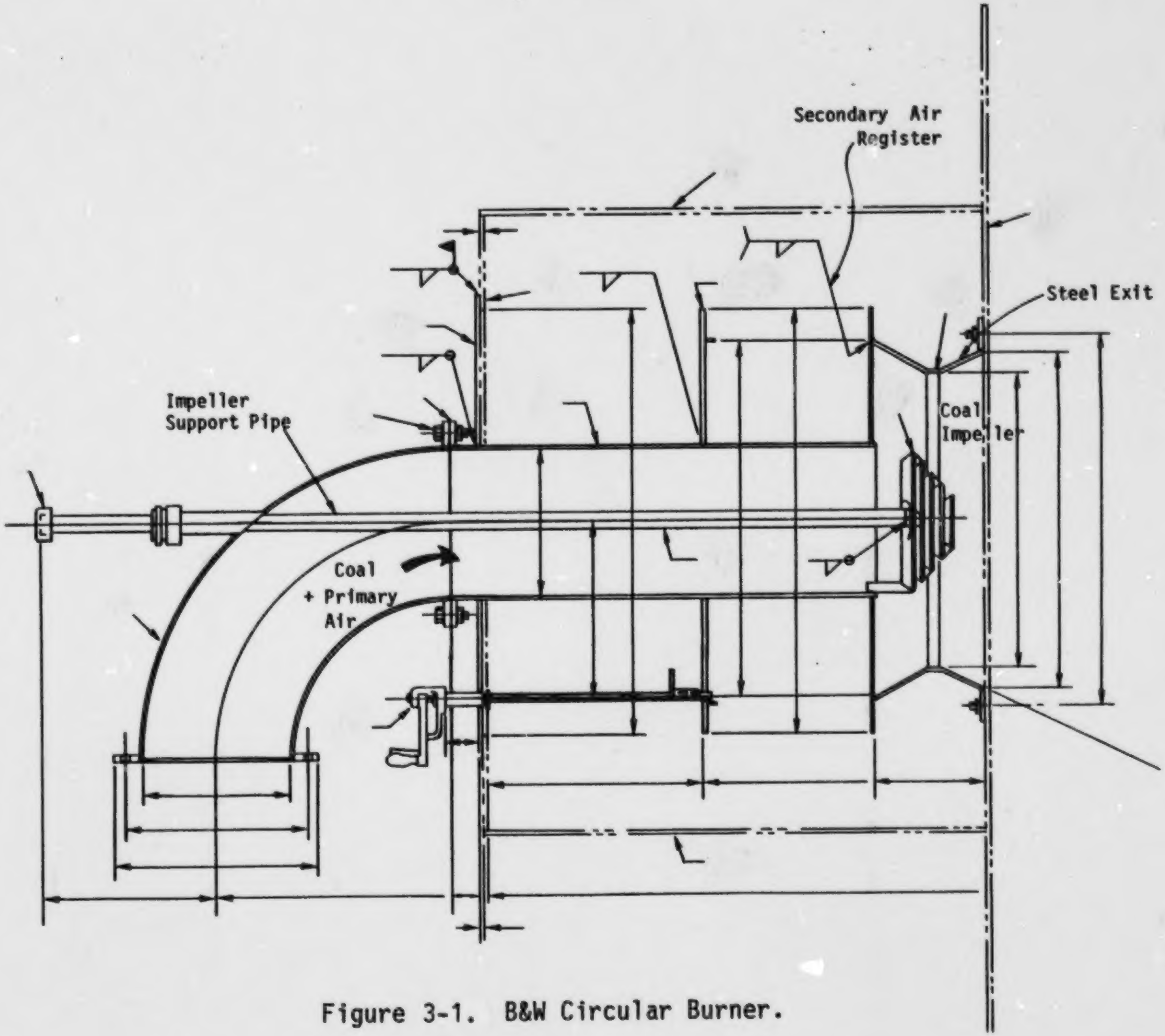
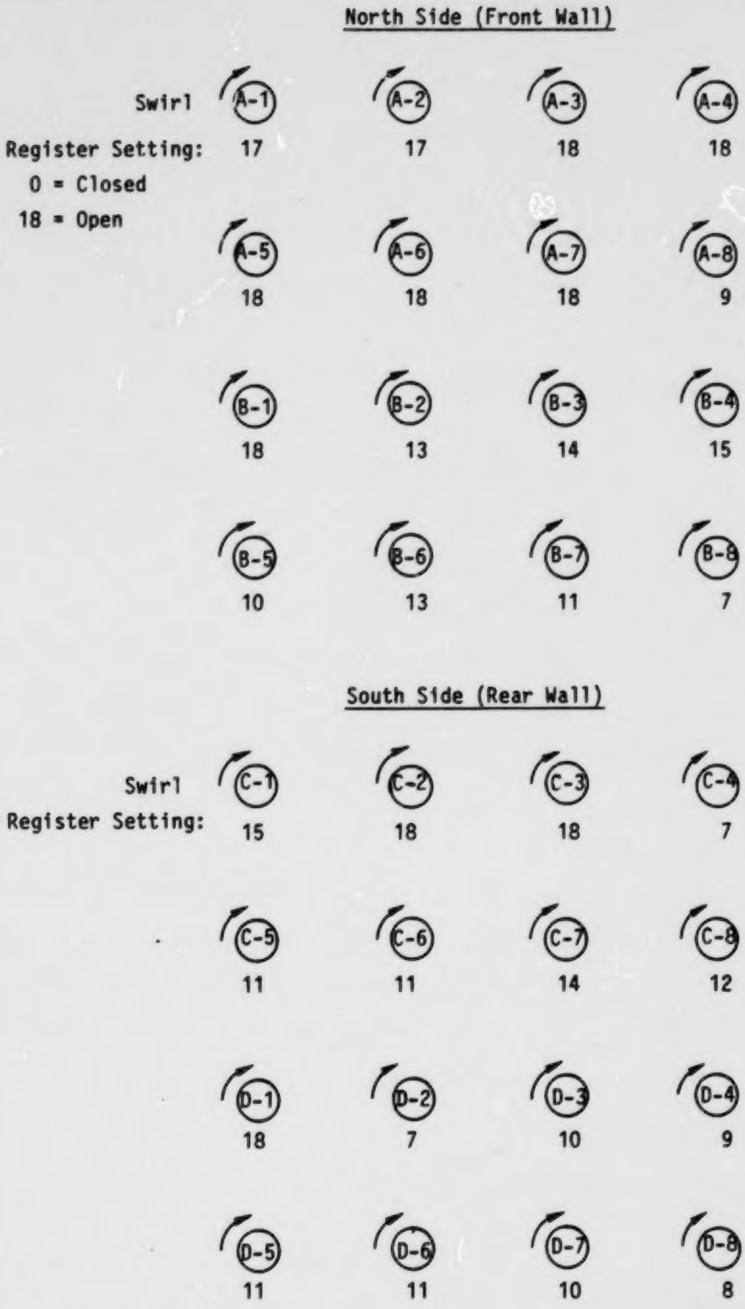

Secondary Air Register
Steel Exit
Coal Impeller
Impeller Support Pipe
Coal + Primary Air

Figure 3-1. B&W Circular Burner.



North Side (Front Wall)

Swirl

Register Setting:

0 = Closed

18 = Open

A-1	A-2	A-3	A-4
17	17	18	18
A-5	A-6	A-7	A-8
18	18	18	9
B-1	B-2	B-3	B-4
18	13	14	15
B-5	B-6	B-7	B-8
10	13	11	7

South Side (Rear Wall)

Swirl

Register Setting:

C-1	C-2	C-3	C-4
15	18	18	7
C-5	C-6	C-7	C-8
11	11	14	12
D-1	D-2	D-3	D-4
18	7	10	9
D-5	D-6	D-7	D-8
11	11	10	8

Figure 3-2. Comanche Unit 2 burner settings.

on both the front and rear wall are operated with clockwise swirl, as viewed looking at the burners, resulting in opposite rotation. The boiler is normally operated with the NO_x ports open 18 percent to provide tempering air in order to prevent superheater fouling. During this test, the ports were closed during the day, but opened during the night.

3.2 Description of Wyodak Unit 1

Wyodak Unit 1 is a radiant reheat boiler manufactured by the Babcock and Wilcox Company (B&W). The plant is located near Gillette, Wyoming, and is owned by Pacific Power & Light Company and Black Hill Power & Light Company. Commercial operation of the plant began in 1978. The plant has a rated capacity of 330 MW_e with a steam flowrate of 2,600,000 lb/hr at 1800 psig and 1000°F. The boiler is equipped with two superheater banks, a pendant reheater, economizer, and regenerative air heater. A diagram of the boiler is shown in Figure 3-3 with key boiler specifications listed in Table 3-2.

F 3-3

T 3-2

The boiler fuel is pulverized subbituminous coal supplied from a mine near the plant. The coal has an average higher heating value of 8000 Btu/lb with 30 percent moisture and 8 percent ash. The sulfur content of the coal is consistently low at about 0.7 percent by weight.

The boiler is equipped with B&W's dual register burner compartmentalized windbox firing system. This firing system was developed by B&W to control fuel and air mixing in the burner zone, thus reducing NO_x emissions and enhancing complete combustion. The dual register burner (DRB), shown in Figure 3-4, consists of a central coal nozzle surrounded by two concentric secondary air passages. The coal nozzle incorporates a venturi to promote a uniform coal distribution. The venturi plug shown in Figure 3-4, had been removed about one year prior to this test program at the Wyodak plant. The absence of this plug has apparently not compromised burner performance. Air flow distribution between the two secondary air passages and swirl generation is controlled by three devices: outer secondary air register, inner secondary air register, and inner secondary air axial spin vanes. The multiple air passages and the associated controls allow variation in the rate

F 3-4

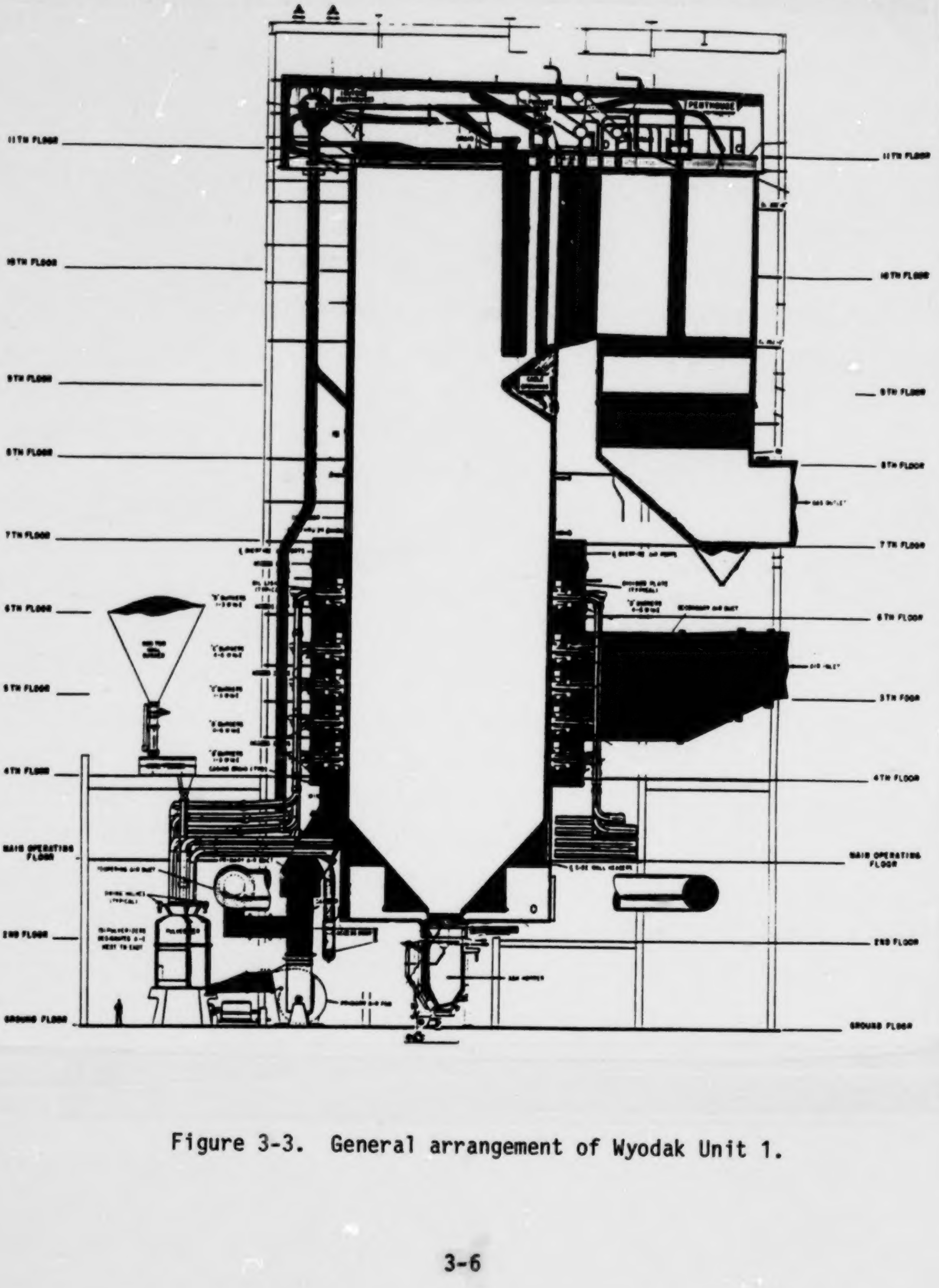

11TH FLOOR
10TH FLOOR
9TH FLOOR
8TH FLOOR
7TH FLOOR
6TH FLOOR
5TH FLOOR
4TH FLOOR
MAIN OPERATING FLOOR
2ND FLOOR
GROUND FLOOR
PENTHOUSE
11TH FLOOR
10TH FLOOR
9TH FLOOR
8TH FLOOR
GAS OUTLET
7TH FLOOR
6TH FLOOR
AIR INLET
5TH FOOR
4TH FLOOR
MAIN OPERATING FLOOR
2ND FLOOR
GROUND FLOOR

Figure 3-3. General arrangement of Wyodak Unit 1.

TABLE 3-2. WYODAK PLANT UNIT 1 BOILER SPECIFICATIONS

Manufacturer	Babcock & Wilcox
Year in Commercial Operation	1978
Gross Electrical Capacity	350 MW_e
Fuel	Pulverized Coal, Wyoming Subbituminous
Burners	
Type	B&W Dual Register
Number	30
Configuration	Horizontal, Opposed-Fired
Array	5 Rows of 3 Burners on Front and Rear Walls
Number of Pulverizers	5
Furnace Dimensions	
Width	46 ft
Depth	45 ft
Height	180 ft
Design Efficiency	83.92% at Maximum Continuous Rating
Steam Flowrate	2,600,000 lb/hr at Maximum Continuous Rating
Steam Pressure	1800 psig
Superheat Temperature	1000°F
Reheat Temperature	1000°F
HA/SC	
Design (5 mills)	387 x 10^3 Btu/hr-ft^2
Field	330 x 10^3 Btu/hr-ft^2

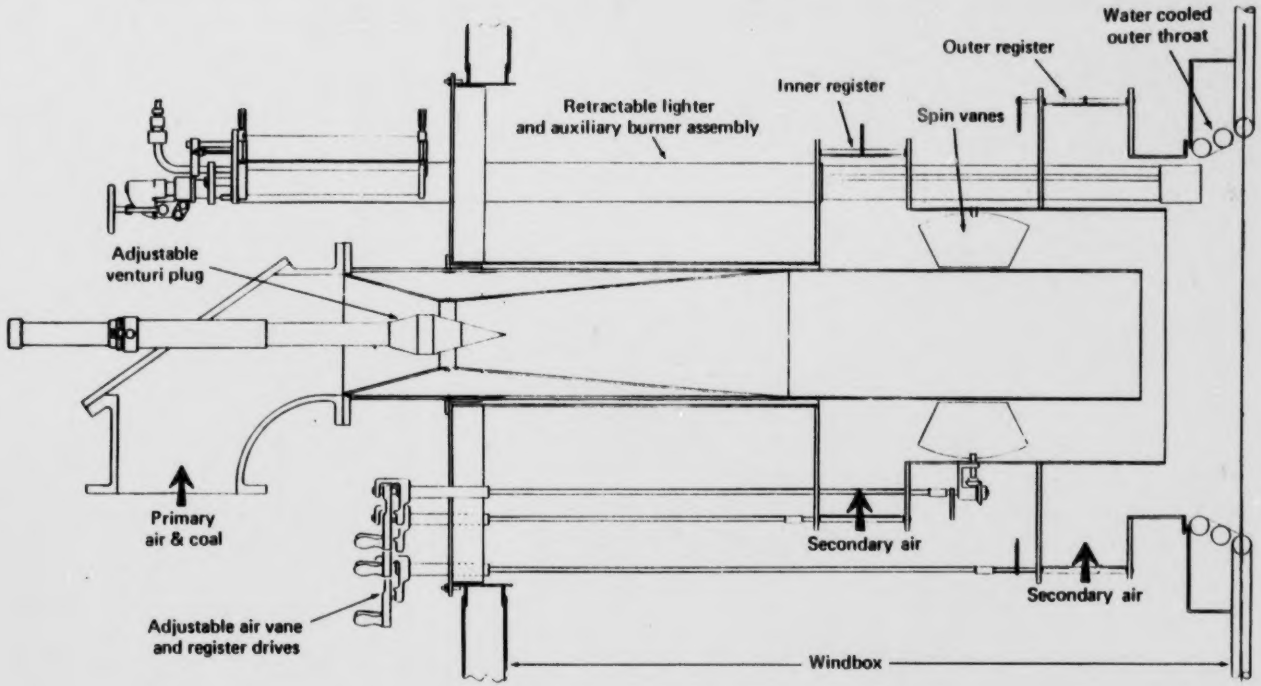

Water cooled outer throat
Outer register
Inner register
Spin vanes
Retractable lighter and auxiliary burner assembly
Adjustable venturi plug
Primary air & coal
Secondary air
Secondary air
Adjustable air vane and register drives
Windbox

Figure 3-4. Babcock & Wilcox dual register burner.

of fuel and air mixing, thereby controlling NO_x emissions. The compartmented windbox separately controls the combustion air flow for the group of burners associated with each pulverizer. The compartmented windbox thus permits balancing the secondary air to each burner group in operation.

Wyodak Unit 1 has 30 dual register burners arranged in a horizontally opposed firing configuration, as shown in Figure 3-5. The 30 burners are arranged in five rows of three burners on both the front and rear walls. Opposing burners are offset avoiding direct flame tail interaction and promoting uniform heat release across the lower furnace. In addition, the top row of burners on both walls, supplied by D mill, is spaced 12 feet above the lower four rows of burners.

During this two-week test period, no adjustments were made to the burner controls. The settings for each burner maintained during this test period are listed in Table 3-3. Each register control had 18 divisions, with notch 1 representing closed and notch 19 representing open. Thus, each division for the registers represents approximately five degrees of motion. The spin controls also have 18 notches, but there is a 2:1 gear ratio that permits 180^o of travel; i.e., 0 to 90^oCW and 0 to 90^oCCW. It is general practice on this unit to have the spin vanes always in the same direction as the outer register.

The predominant firing configuration for full load operation at Wyodak during this test was with D mill and the associated top row of burners out of service and all the other mills and burners in service. When a mill is taken out of service, the air flow to the idle burners is reduced to provide only flow to cool the burner components. With D mill out of service, the windbox compartment for burners D1-D6 is closed so that only about 10 percent of the total secondary air is supplied for cooling. The other additional configuration had C mill, which supplies burners C1-C6, out of service. These three cases allowed evaluation of the effect of firing pattern on boiler performance and emissions.

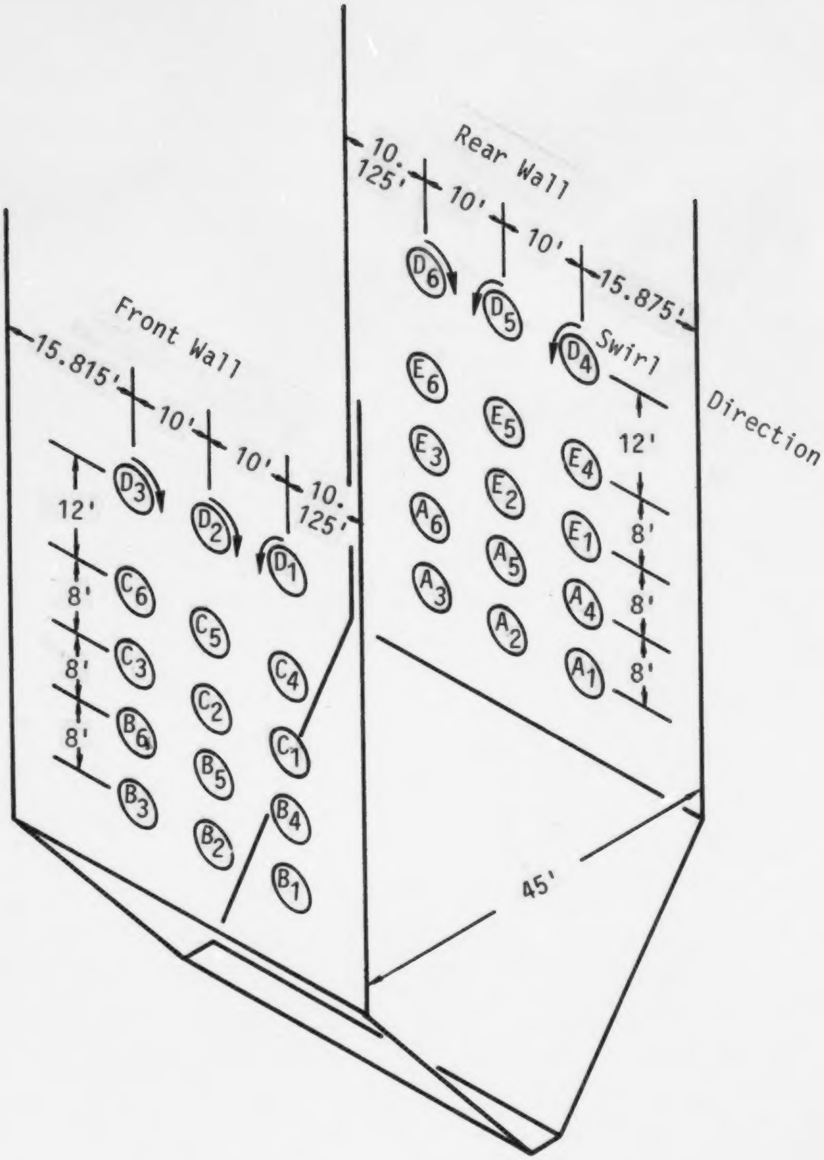

Rear Wall
10.125'
10'
10'
15.875'
Swirl Direction
Front Wall
15.815'
10'
10'
10.125'
12'
8'
8'
8'
12'
8'
8'
8'
45'
D6
D5
D4
E6
E5
E4
E3
E2
E1
A6
A5
A4
A3
A2
A1
D3
D2
D1
C6
C5
C4
C3
C2
C1
B6
B5
B4
B3
B2
B1

Figure 3-5. Wyodak Unit 1 burner arrangement.

TABLE 3-3. WYODAK UNIT 1 BURNER SETTINGS

Front Wall				Rear Wall			
Burner	Outer Register*	Inner Register*	Spin Vanes*	Burner	Outer Register*	Inner Register*	Spin Vanes*
B1	7	6	5	A1	8	10	3
B2	9	10	2	A2	8	10	7
B3	7	10	2	A3	9	10	5
B4	7	9	2	A4	9	10	4
B5	8	10	2	A5	10	11	5
B6	7	11	2	A6	9	10	4
C1	9	10	2	E1	9	10	4
C2	8	10	4	E2	9	10	5
C3	9	10	3	E3	9	9	4
C4	5	8	4	E4	9	10	4
C5	5	7	2	E5	9	10	4
C6	9	8	3	E6	8	9	4
D1	10	10	3	D4	9	10	5
D2	9	10	3	D5	9	10	3
D3	9	11	3	D6	9	9	5

*Notches Open

3.3 Test Plan

The field evaluations consisted of monitoring boiler performance for one week at the Comanche boiler and for two weeks at the Wyodak boiler. Testing at Comanche was reduced because additional data was available from previous testing by Exxon (Reference 1) for the EPA in 1977. During tests at both boilers, boiler operating conditions were established by the boiler operators.

Figure 3-6 shows the field test plan for both boilers. Boiler operating conditions and performance were monitored using plant instrumentation. Gaseous emissions of NO_x, O_2, CO, SO_2, and CO_2 were continuously monitored using a mobile test trailer. Sampling was performed at both boilers using an array of probes located at the air heater inlet. Coal and ash samples were collected from selected points throughout the boiler for analysis.

Burner performance was assessed using observations of flame characteristics and evaluation of combustion efficiency as determined from ash analyses and CO emissions. The relative fuel/air balance to the burners was assessed by gas stratification measurements obtained at the air heater inlet. In addition, furnace gas temperatures were measured at Wyodak using a water-cooled suction pyrometer. Detailed descriptions of the test procedures are included in Appendix A.

1.0 BOILER DATA FROM PLANT INSTRUMENTATION

- FUEL FLOWRATE
- STEAM QUALITY AND FLOWRATE
- WATER/STEAM TEMPERATURES AND PRESSURES
- AIR/FLUE GAS TEMPERATURES AND PRESSURES
- BOILER LOAD CYCLE
- RANGE OF BURNER OPERATING CONDITIONS

2.0 EXHAUST GAS MEASUREMENTS BY EER

- CONTINUOUS MONITORING OF NO_x, CO, CO_2, O_2, SO_2 AT AIR HEATER INLET
- PERIODIC ANALYSIS OF COAL AND ASH COMPOSITION:
  - COAL FEED
  - FLY ASH AT AIR HEATER INLET
  - BOTTOM ASH
  - PARTICULATE COLLECTOR HOPPER

3.0 BURNER/BOILER PERFORMANCE

- FLAME OBSERVATIONS
- COMBUSTION EFFICIENCY FROM COAL AND FLUE GAS MEASUREMENTS
- FURNACE GAS TEMPERATURE WITH WATER-COOLED PROBE AT WYODAK

Figure 3-6. Field test plan.

4.0 TEST RESULTS

4.1 Results at Comanche Unit 2

Emissions testing of the B&W circular burner was conducted by EER at Comanche Unit 2 from December 7 through December 12, 1984. Gaseous emissions of NO_x, O_2, CO, SO_2, and CO_2 were continuously monitored during this period. The plant was operated in response to system demand. The NO_x overfire air ports are normally partially open. At the request of EER, the ports were closed during the day, but opened at night. Otherwise the boiler operating conditions were established by the plant operators. Emissions were measured at this unit by Exxon in 1977 as part of another EPA program. Exxon's results are compared to the results of the current test program.

During the week of testing, boiler load varied from 150 to 360 MW. The trends for the daily averages of gaseous emissions and boiler load are shown in Figure 4-1. The overall averages are summarized in Table 4-1. During a portion of the testing the boiler was operated with mill A out of service. The A mill supplies coal to the upper two burner rows on the front wall. Excess O_2 varied from only 2.5 to 3.5 percent O_2. A brief series of tests was performed at 300 MW to assess the impact of the NO_x overfire air ports on NO_x emissions.

F4-1
T4-1

NO_x and CO emissions as a function of boiler load are presented in Figure 4-2. NO_x emissions with all mills on and the overfire air ports closed showed the following correlation:

F4-2

$$NO_x \text{ (ppm @ 0\% } O_2) = (1.136)(\text{Load, MW}) + 148$$

Nominal NO_x emissions at full load of 360 MW were 550 ppm @ 0 percent O_2, corresponding to 0.64 lbs/10^6 Btu. These emissions are substantially lower than the NO_x measured by Exxon of 847 ppm @ 0 percent O_2 (0.99 lbs/10^6 Btu). The Exxon data were obtained at a higher excess O_2 level, 5.2 percent compared to 2.7 percent, however. Operation with the A mill out of service resulted in a slight decrease in NO_x emissions. This result could be due to

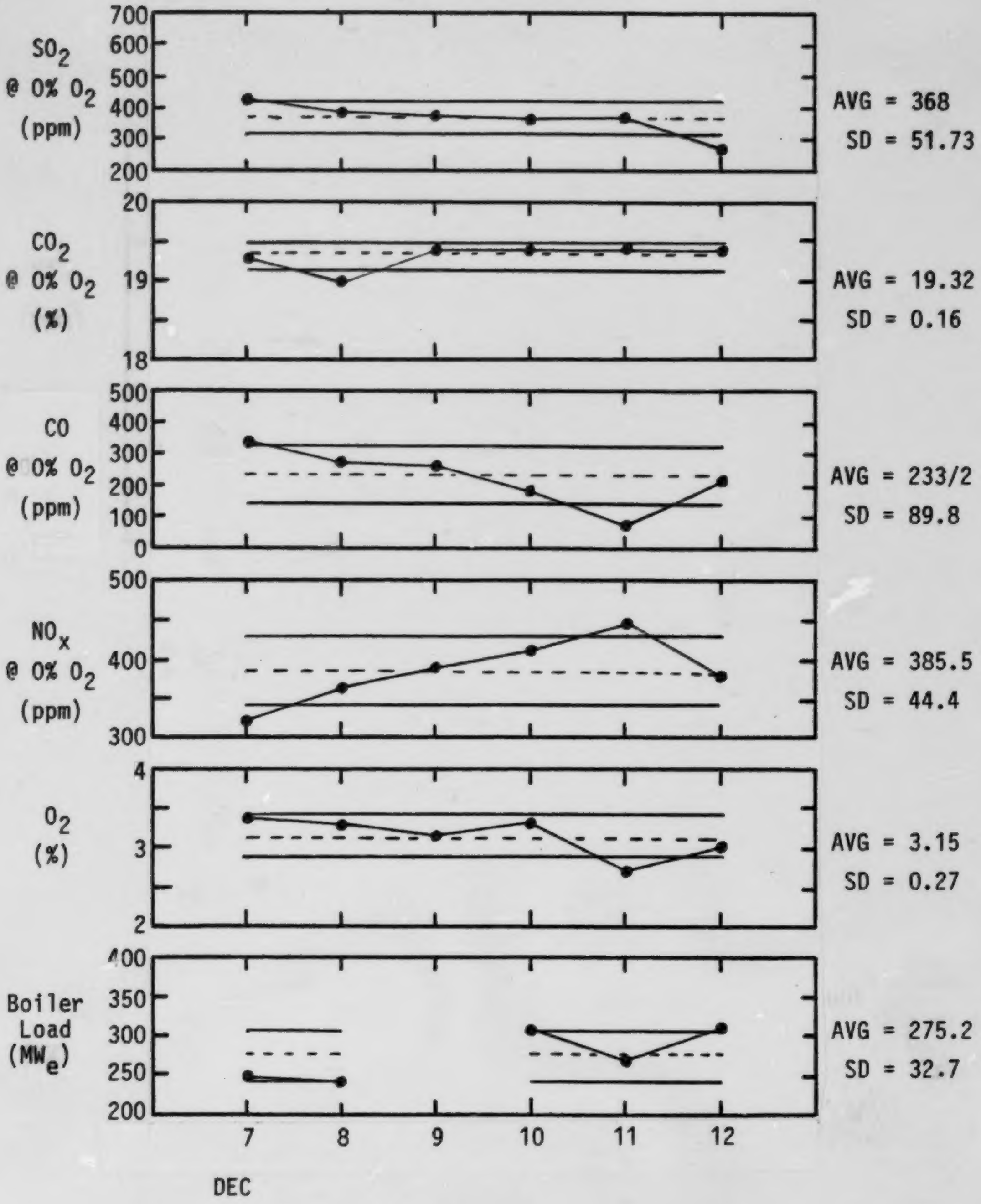


Figure 4-1. Daily averages of gaseous emissions--Comanche Unit 2.

TABLE 4-1. AVERAGE EMISSIONS AT COMANCHE UNIT 2
DECEMBER 7-12, 1984

Species	Average Concentration		
	Measured	@ 0% O_2	$lb/10^6$ Btu
O_2	3.15%	--	--
NO_x	328 ppm	386 ppm	0.45
SO_2	313 ppm	368 ppm	--
CO	198 ppm	233 ppm	--
CO_2	16.4%	19.3%	--

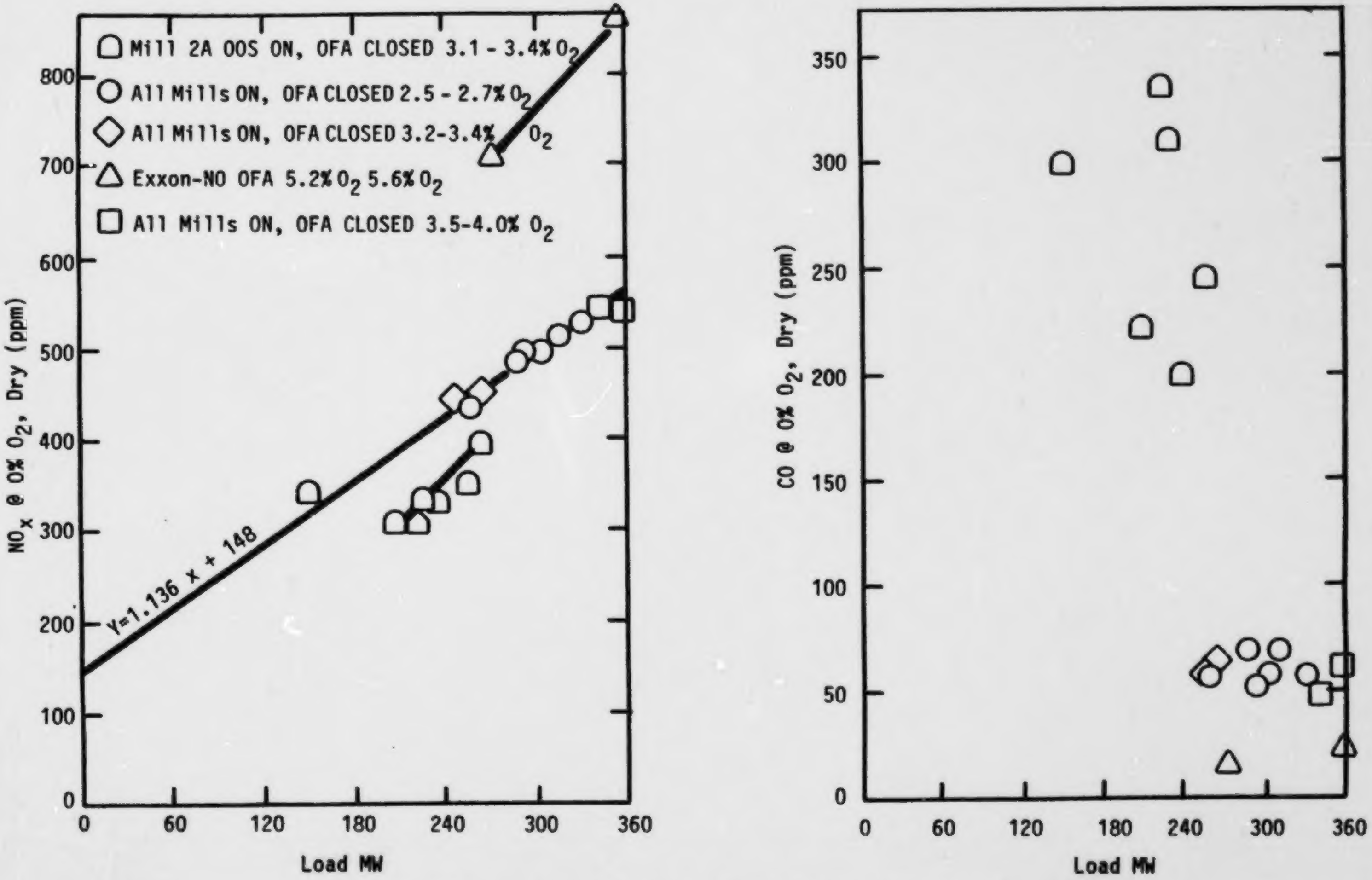


Figure 4-2. NO_x and CO vs. load - Comanche Unit 2.

a decrease in the ratio of firing rate to cooled surface area or to a degree of combustion staging. Here, combustion staging refers to operation with the burner zone at a lower stoichiometry and with the addition of combustion air above the burner zone. The latter conclusion is supported by the measured CO emissions and by the operating excess air level. With all coal mills (and burners) in service, combustion efficiency was typically high, as indicated by low CO emissions in the range of 50 to 60 ppm. However, operation with the A mill out of service resulted in increased CO emissions of up to 500 ppm. Increased CO emissions would be consistent with a decrease in combustion efficiency due to relatively poor fuel/air mixing that could be associated with a degree of combustion staging occurring with the A mill off. In addition, the boiler operating excess air level was generally not increased when the A mill was taken out of service. Since the idle burners would need to be supplied with cooling air, operation at a constant excess air level would result in a lower burner zone stoichiometry with the A mill out of service, resulting in a degree of combustion staging.

F4-3

Figure 4-3 shows NO_x and CO emissions vs. excess O_2 at a constant load of 253 to 273 MW. In general, the data taken during the current test do not have enough variation in O_2 level to indicate a trend. However, comparing the current data with the previous Exxon data would suggest a strong dependence of NO_x on excess O_2. This is typically the case with subbituminous coals as indicated in LWS tests.

F4-4

Exhaust gas composition was measured using an array of 12 probes in the two exhaust ducts upstream of the air heater. The gas compositions at each sampling location were measured on December 10 and 11, 1984 to determine gas stratification. In wall-fired boilers, gas stratification measurements upstream of the air heater can typically be used to evaluate the side to side balance of fuel and air to the burners. Figure 4-4 shows the results of the stratification measurements at Comanche. Although some variation in O_2 and CO levels is evident, no consistent imbalance between the two ducts or within each duct can be seen from these data. Thus, adjustment of the burners to improve the air/fuel balance would be expected to result in only a minor improvement in combustion performance.

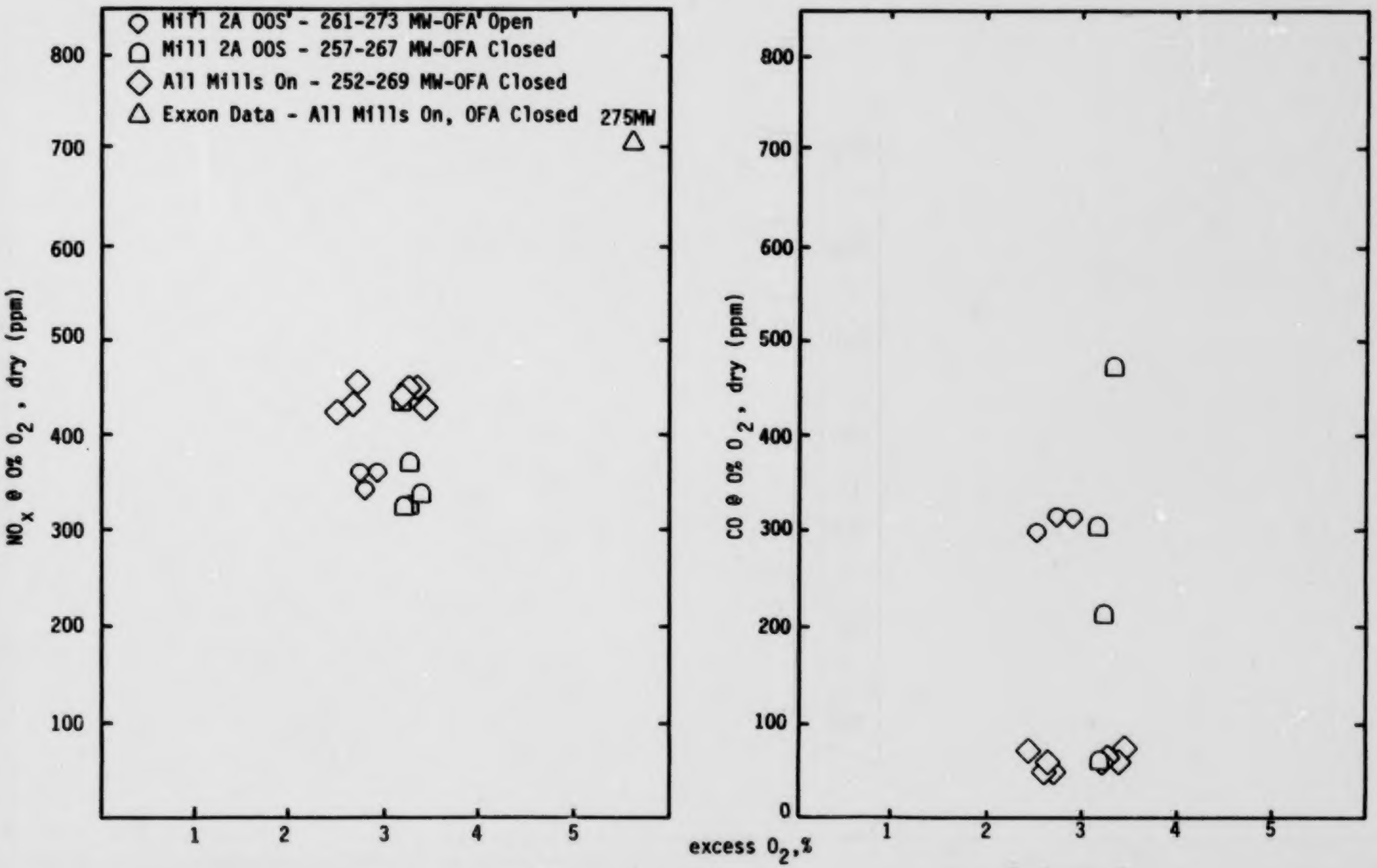


Figure 4-3. Comanche Unit 2 - NO_x and CO vs. excess O_2 at a load of 253-273 MW_e.

12-10-84 A

O_2,%	3.29	4.59	2.89
NO_x,ppm	504	480	350
CO,ppm	36	77	186
	2.99	3.26	3.74
	478	420	335
	35	59	416

Avg O_2 3.46%

B

5.24	4.74	2.49
379	400	306
94	129	-
2.99	2.49	3.74
355	340	401
187	228	122

Avg O_2 3.61%

12-11-84 A

3.73	2.67	4.72
517	476	451
84	91	102
4.12	2.57	3.55
454	479	457
49	45	42

Avg O_2 3.56%

B

2.00	1.92	2.52
475	473	426
43	43	56
4.02	2.17	2.87
483	446	417
48	145	57

Avg O_2 2.58%

Figure 4-4. Comanche gas stratification test.

Figure 4-5 shows the effect of opening the overfire air ports on NO_x and CO emissions. Opening the ports resulted in a substantial decrease in NO_x emissions. This trend is similar to that seen during the Exxon testing, except that no decrease in NO_x was observed until the ports were opened more than 30 percent. Evidently the back lash in the mechanical linkage resulted in the ports not actually opening until the indicator was past 30 percent. Thus, although the plant normally operates with the ports 18 percent open, they may actually be closed.

Fig. 5

Unlike the results seen during the Exxon tests, however, opening the overfire air ports resulted in a large increase in CO emissions, to over 800 ppm at the maximum opening, indicating a substantial decrease in combustion efficiency.

4.2 Results at Wyodak

Emissions and boiler performance were monitored at the Wyodak plant from January 31 to February 14, 1985. During this test period, the unit was operated based on normal practice following system demand. The boiler was essentially base loaded through the test program with only brief load variations. A short boiler outage occurred between February 7 and 10, for necessary boiler repairs.

The primary objective of the test program was to characterize the performance of B&W Dual Register Burners in a typical utility boiler. The burner performance was determined based on CO emissions, flame characteristics, and efficiency. Emissions measured included continuous monitoring of NO_x, CO, O_2, CO_2 and SO_2. Visual observations were made through available inspection ports to determine flame characteristics to the extent possible. Combustion efficiency was determined by analysis of unburned carbon content in fly ash samples and measurement of CO emissions. In addition, the overall boiler efficiency was determined based on calculation of the heat rate during the test period.

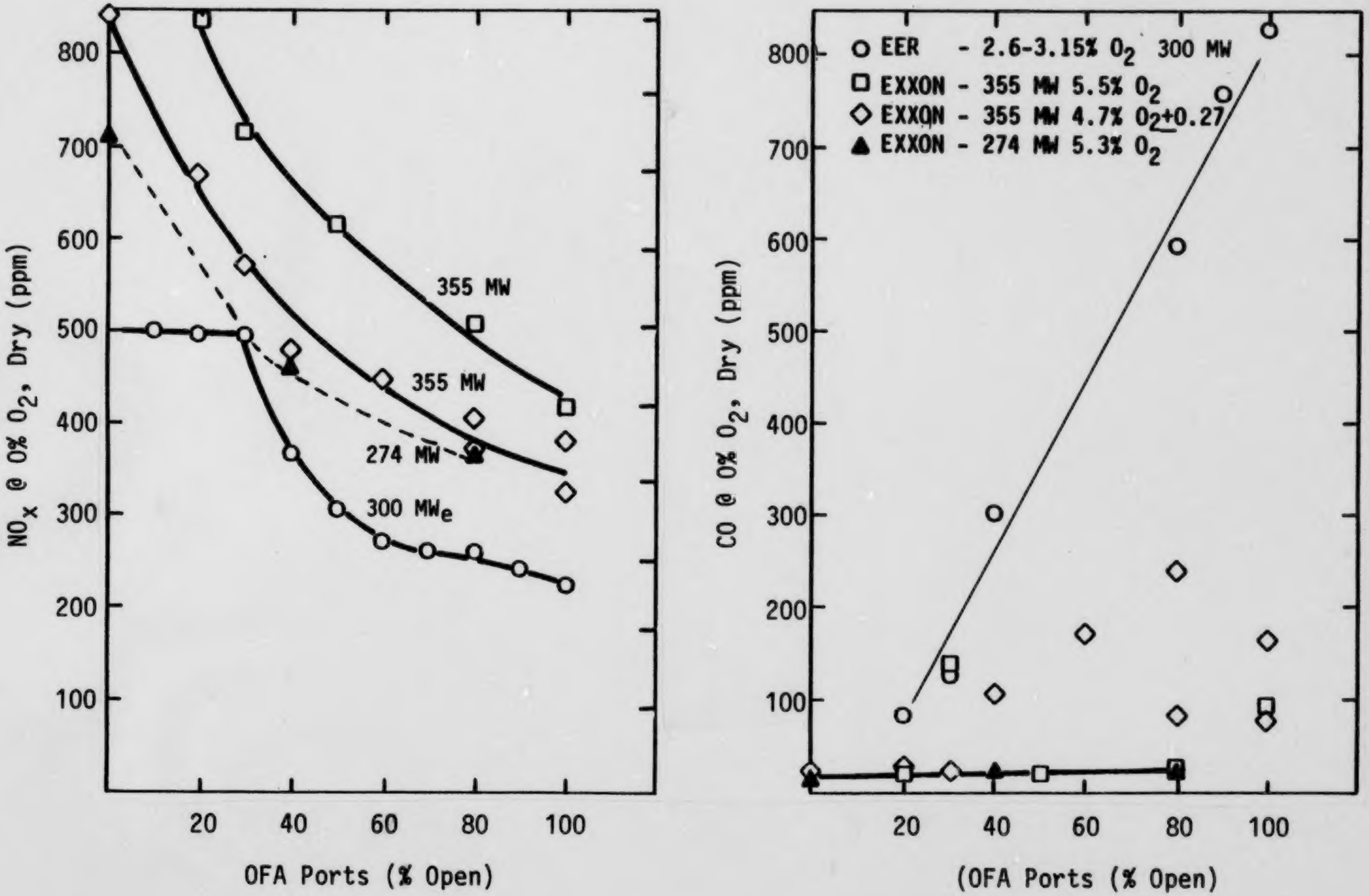


Figure 4-5. Effect of overfire air port damper position on emissions - Comanche.

4.2.1 Emissions

Emissions were monitored at the economizer outlet of Wyodak Unit 1. The gaseous species monitored included O_2, CO, CO_2, NO_x and SO_2.

A continuous emissions monitoring system was used to measure the gaseous species with an array of eight probes. Four probes were placed in each of the two ducts leading from the economizer to the air heater to ensure a representative sample. The gas sample flow rate was balanced to provide an equal sampling rate through each of the eight probes. In addition, each of the probes was monitored individually at a typical operating condition during the test period to determine the presence and extent of stratification of the gas stream. The gas stratification test was conducted on February 6 between 9:30 to 11:00 AM with the unit running at 360 MW_e gross output and with D mill out of service. The results of this test are shown in Figure 4-6 and summarized in Table 4-6. The concentration profiles of O_2, NO_x, and CO shown in Figure 4-5, indicate that the gas concentrations are slightly higher in the west duct. Previous tests at other boilers have shown that burner-to-burner imbalances in fuel or air flow result in non-uniform gas concentrations across the width of the boiler. Thus, slight burner-to-burner flow imbalances may account for the differences measured during the stratification test.

F4-6

T4-2

Averaged concentrations for the two ducts are compared with gas concentrations from balanced sampling with all probes before and after the individual probe stratification test in Table 4-2. Again, the O_2 concentration in the west duct was slightly higher than measured in the east duct. Associated with the higher oxygen concentration in the west duct are higher NO_x emissions. This is an indication that careful control of excess air and proper balances of fuel and air, from burner to burner is beneficial in reducing overall NO_x emissions. Differences between averaged concentrations from the two ducts and balanced probe sampling are about 5 percent, which is within the fluctuations typical of normal boiler operation.

	West Duct		East Duct	
O_2 (%)	4.48	4.43	3.98	3.23
	4.28	4.97	4.64	3.96
NO_x (ppm) Measured → (@ 0% O_2) →	271 (344)	263 (333)	271 (334)	254 (300)
	267 (335)	279 (365)	267 (342)	244 (300)
CO (ppm) Measured → (% 0% O_2) →	33 (41)	35 (45)	35 (43)	34 (40)
	58 (73)	40 (52)	29 (37)	31 (38)

Figure 4-6. Stratification test results at economizer outlet.

TABLE 4-2. SUMMARY OF STRATIFICATION AT ECONOMIZER OUTLET

Sample	O_2 (%)	NO_x (ppm @ 0% O_2)	CO (ppm @ 0% O_2)
Average West Duct	4.54	344	53
Average East Duct	3.95	319	40
Average Both Ducts	4.24	331	46
All Probes Balanced	4.03	318	51

Hourly averages of the gaseous emissions were calculated from the continuous monitoring data. These hourly averages are tabulated in Appendix C-3. The hourly averages were used to calculate daily and overall averages for the test period. The overall averages of measured gas concentration for the test period are summarized in Table 4-3. These values represent essentially base-loaded operation, with only about four hours of reduced load operation during the test period. The NO_x emission rate of 0.40 $lb/10^6$ Btu is below the Federal New Source Performance Standard of 0.5 $lb/10^6$ Btu for subbituminous coal-fired boilers.

T4-3

The trends for the daily averages of gaseous emissions and boiler load are shown in Figure 4-7. A short boiler outage occurred between February 7 and 10 during which time no emissions data was collected. The plant load averaged 358 MW_e during the test period when in operation, with only 1 percent relative deviation. Close control was maintained on the operating excess air level, indicated by 2.5 percent deviation from the average of 4.03 percent O_2 measured in the flue gas. CO emissions were low throughout the test period and averaged about 51 ppm. The variations in CO measured at this low level are generally considered to be insignificant. The CO_2 and SO_2 emissions, which are directly related to the coal composition, also showed variations that were generally small.

F4-7

Gaseous emissions, including NO_x emissions, were monitored primarily with continuous analyzers. In addition, NO_x emissions were measured following EPA Method 7 procedures on one day during the test period to verify the accuracy of the continuous monitors. The results of the EPA Method 7 sampling are summarized in Table 4-4 with details included in Appendix B: Quality Assurance. The discrete Method 7 samples are compared with the continuous monitor responses in the table. Each Method 7 value represents a set of three discrete samples while the continuous monitor value is time averaged during the Method 7 sampling period. The agreement between the two measurement techniques is good. The continuous monitors were within about 13.7 percent, including 95 percent confidence interval, of the EPA standard method.

TABLE 4-3. AVERAGE EMISSIONS AT WYODAK UNIT 1 JANUARY 31 - FEBRUARY 14, 1985

Species	Average Concentration		
	Measured	@ 0% O_2	lb/10^6 Btu
O_2	4.03%	--	--
NO_x	278 ppm	344 ppm	0.40
SO_2	584 ppm	723 ppm	1.17
CO	42 ppm	52 ppm	0.03
CO_2	15.7%	19.4%	216.7

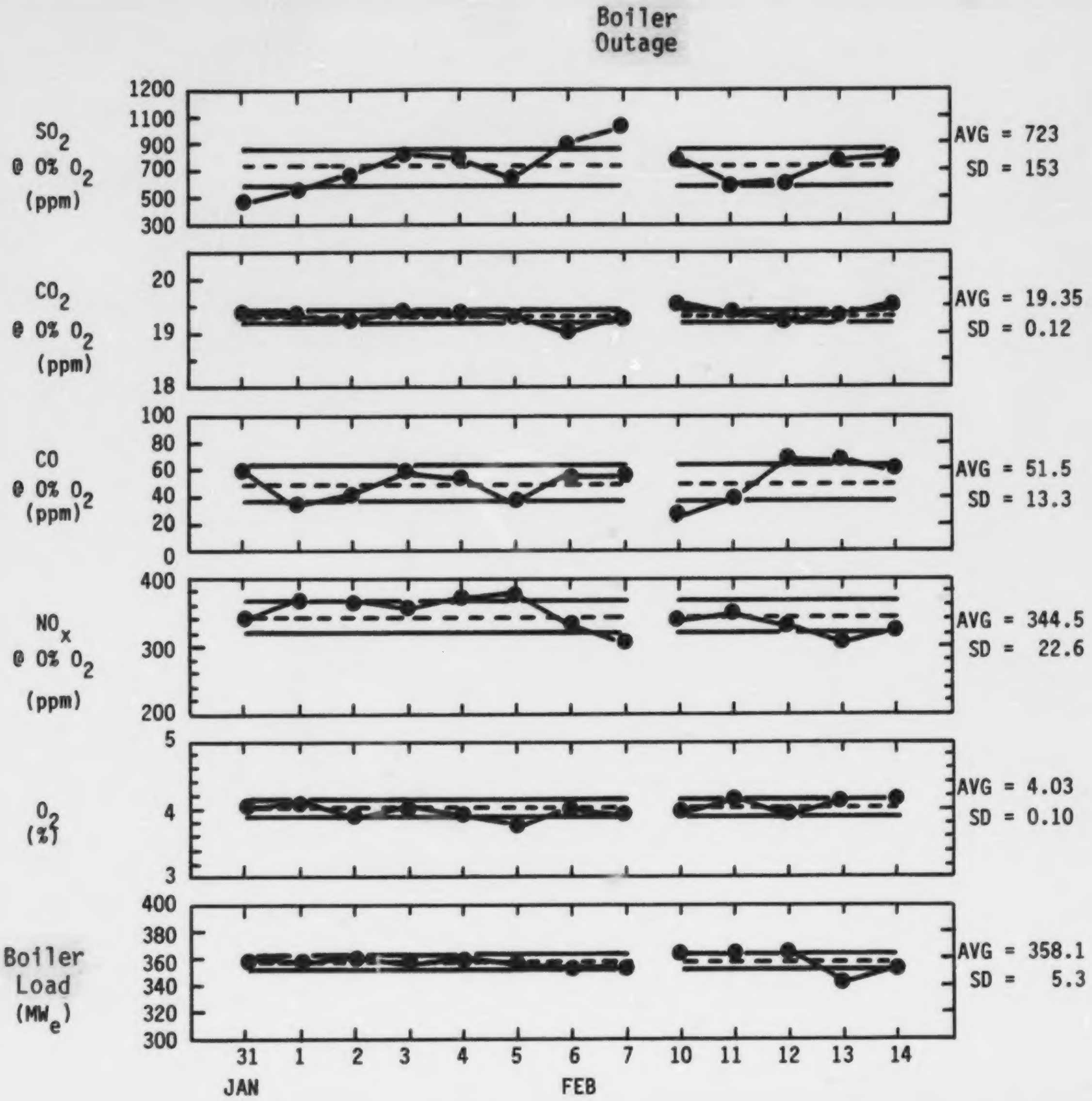


Figure 4-7. Daily averages of gaseous emissions.

TABLE 4-4. COMPARISON OF NO_x MEASURED BY CONTINUOUS MONITORING SYSTEM AND EPA METHOD 7 SAMPLES AT ECONOMIZER OUTLET

Date	Time	NO_x @ 0% O_2, dry	
		Method 7	CMS
2-4-85	1603	358	395
2-4-85	1612	368	397
2-4-85	1616	368	400
2-4-85	1623	357	405

NO_x emissions at Wyodak were sensitive to burner firing arrangement and boiler load. These effects are shown in Figure 4-8. The data are averages of hourly emissions for three firing configurations. The primary configuration at Wyodak has the D mill out of service. The D mill supplies the top row of burners on both the front and rear walls. The two other firing configurations were: (1) all mills and burners in service and (2) "C" mill out of service. The burners supplied by C mill are the second and third rows from the top on the front wall.

F4-8

Operation with the D mill out of service resulted in the lowest average NO_x emissions (344 ppm at nominal full-load operation), while operation with all mills and burners in service resulted in the highest NO_x emissions (395 ppm at nominal full-load operation). An intermediate level of NO_x emissions was produced with the C mill out of service. These results are somewhat surprising since operation with the D mill out of service produces the highest HA/SC ratio. In general, the effects of the boiler firing configuration on NO_x emissions could be due to slight variations in the burner operating stoichiometry (combustion staging) or to changes in the burner flame length and, consequently, changes in the degree of flame confinement and flame-to-flame interactions. Since the excess air level was similar for operation with all mills in service and for operation with the C mill out of service, the burners in the latter case could have been operating at a slightly lower stoichiometry, resulting in a decrease in burner NO_x emissions. However, when the D mill was taken out of service, the boiler was operated at a higher excess air level. This result is consistent with the standard B&W practice of increasing the operating excess air level as a result of supplying additional air to cool the idle burners. Therefore, it is likely that the burners were operating at the design stoichiometry. Since operation with the D mill out of service would have required the burner throughput to increase, it is possible that the flame length could have changed. As indicated by the results of the LWS burner studies, NO_x production from the dual register burners correlates directly with flame length. In addition, variations in the boiler firing configuration and burner flame length would be expected to influence the boiler flow patterns and flame-to-flame interactions and could possibly account for the variations

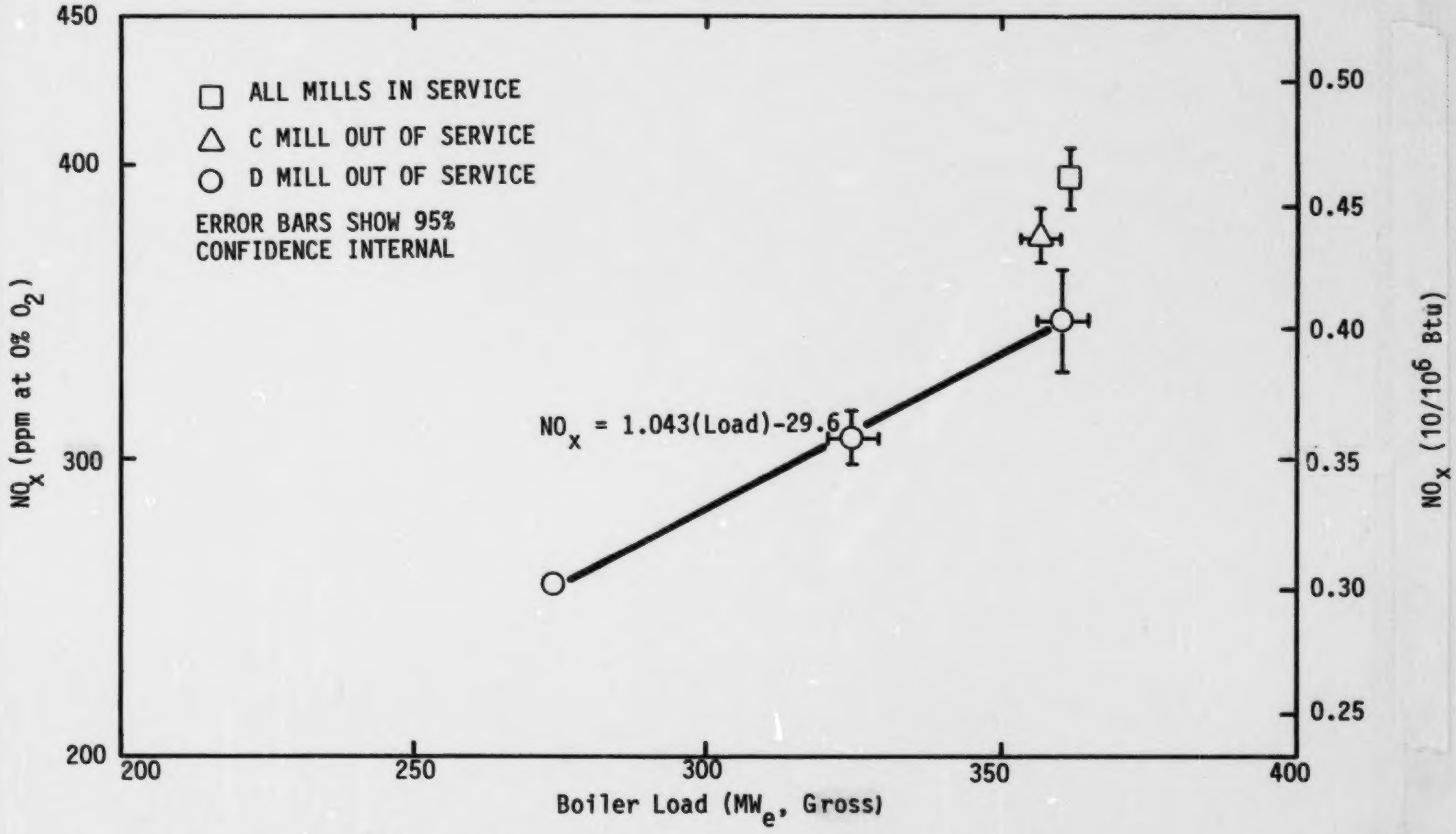


Figure 4-8. Correlation of NO_x emissions with load.

in NO_x emissions. Although this analysis is simplistic, these results do indicate the importance of burner arrangement and firing configuration on burner performance.

Limited data were obtained at reduced loads with D mill out of service. For typical coal-fired boilers, NO_x increases with load due to increasing combustion intensity and fuel/air mixing rates. As shown in Figure 4-8, NO_x emissions correlate essentially linearly with boiler load. Least square linear regression yields the following correlation for operation with the D mill out of service:

$$NO_x \text{ (ppm @ 0\% } O_2) = 1.043 \times \text{Load } (MW_e) - 29.6,$$

while the correlation obtained for all data taken during the field test was:

$$NO_x \text{ (ppm @ 0\% } O_2) = 1.25 \times \text{Load } (MW_e) - 77.$$

These relationships only apply over the small range of excess air levels at which the boiler operated during this field test.

4.2.2 Boiler Performance

Boiler performance during the field evaluation was monitored using the plant instrumentation and measurements performed by EER. Boiler performance parameters of interest included:

1. Coal characteristics
2. Mill performance
3. Burner performance
    - Air/fuel mixing
    - Flame characteristics
    - Combustion efficiercy
    - Burner pressure drop
4. Boiler heat rate
5. Furnace gas temperatures

The Wyodak plant is typically base loaded and operates almost continuously at full load of about 360 MW gross. During the two week test period, the plant experienced no significant operating problems and operated at full load with the following brief exceptions:

1. Two day outage on February 8 and 9, 1985.
2. Three hour outage on February 12, 1985 caused by an electrical disturbance in the power distribution system unrelated to station operation.
3. Five hours of low load operation at 275 MW on February 13, 1985 at the request of EER.
4. Two hours of operation at 325 MW on February 14, 1985 at the request of EER.

Wyodak uses Powder River Basin coal, which is mined locally. The coal has a low sulfur content with approximately 30 percent moisture and a higher heating value of 8000 Btu/lb. Coal moisture, ash, sulfur and heating value are monitored daily by the station. These results and coal analyses by EER are presented in Appendix C. With the exception of sulfur content, coal properties did not vary substantially during the test period. Coal sulfur varied from about 0.3 to 0.7 percent, as received.

The boiler is equipped with five mills, but can operate at full load with only four mills in operation. During the majority of the test period, the plant operated with the D mill out of service. The D mill supplies coal to the top row of burners on both the front and rear walls. The boiler operated with the C mill out of service during February 4 and 5, 1985 to allow repairs on the C mill. The boiler also operated will all mills in service during the brief periods while the C mill was taken offline and brought back online. Mill performance was satisfactory during the test period. Coal fineness test results provided by the station showed fineness to vary from 68 to 85 percent less than 200 mesh. Detailed fineness results are included in Appendix C.

Burner performance with the dual register burners was satisfactory throughout the test program. Air/fuel distribution between burners was relatively uniform, as shown by flame observations and by variations in excess O_2 concentrations in the exhaust duct prior to the air heater. Flame observations showed the flame shapes to be uniform and stable for all burners. Exact flame length was difficult to evaluate due to the lack of observation ports in the middle of the furnace side walls. Flame lengths appeared to be relatively long, however, extending from 1/2 to 3/4 of the distance across the furnace. The burners on the front and rear walls are offset to minimize flame interactions.

Combustion efficiency was very high, as measured by carbon in the fly ash and CO emissions. Carbon in the ash averaged 0.16 percent, corresponding to a carbon utilization of 99.98 percent. Ash analyses are included in Appendix C. Carbon monoxide emissions were stable, averaging less than 60 ppm.

Overall boiler performance and electrical generation efficiency were measured in terms of the gross plant heat rate, the ratio of fuel heat input to gross electrical production (Btu/kw hr). The average heat rate during the test period was 10,236 Btu/kw hr compared to the design heat rate of 10,177 Btu/kw hr. Thus, overall boiler performance was satisfactory, with efficiency very near to design conditions.

Upper furnace gas temperatures were measured during full load operation using a water-cooled suction pyrometer. Figure 4-9 shows the range of temperatures measured. The furnace exit temperature at the inlet to the superheater pendants varied from 1120 to 1359°C. The temperatures at the bottom portion of the superheater are above the ash fusion temperature of about 1200°C, and thus some buildup of ash/slag deposits could be expected in this region. However, fouling of the superheater tubes was not observed to be a significant operational problem during testing. The impact of sootblowing on furnace gas temperatures was evaluated during testing. The results shown in Table 4-9 show sootblowing to have very little effect on gas temperatures.

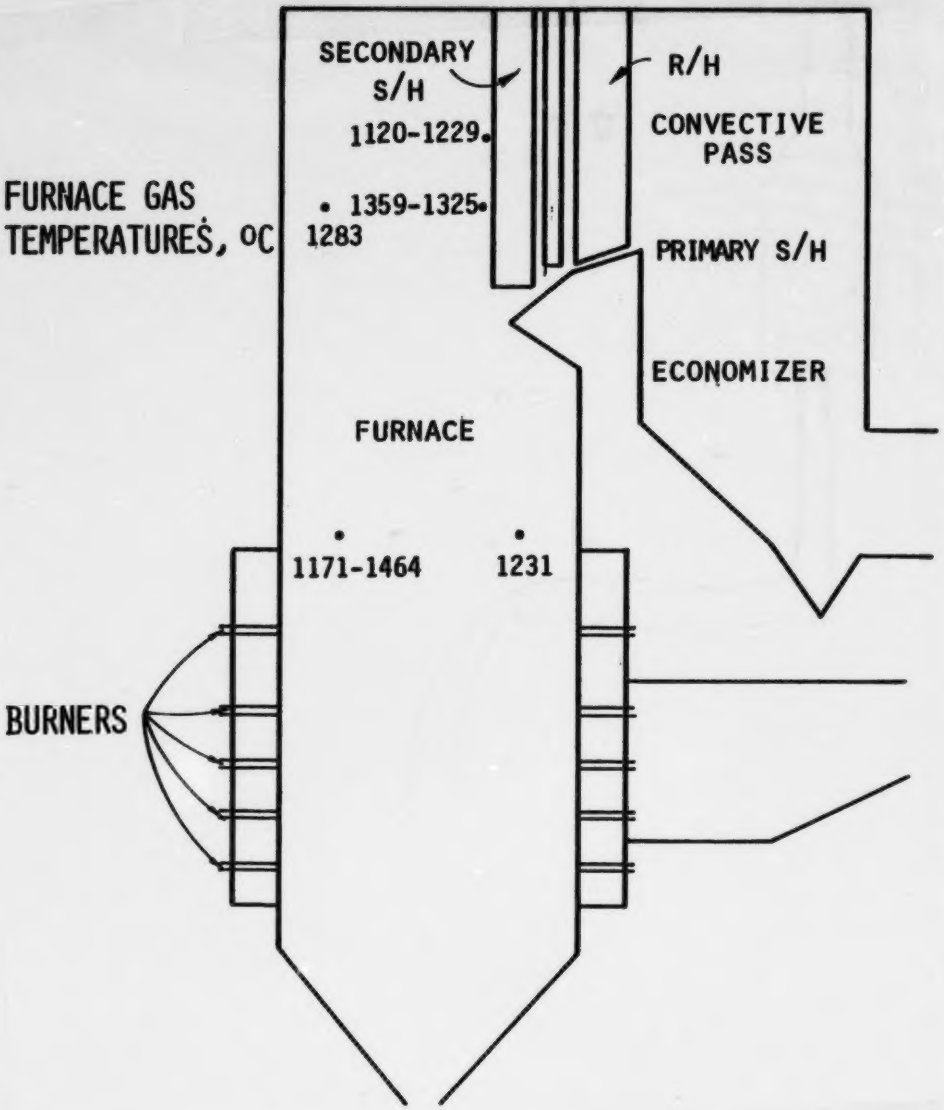

SECONDARY S/H
R/H
1120-1229
CONVECTIVE PASS
FURNACE GAS TEMPERATURES, °C
1359-1325
1283
PRIMARY S/H
ECONOMIZER
FURNACE
1171-1464
1231
BURNERS

Figure 4-9. Wyodak furnace gas temperatures.

TABLE 4-9. EFFECT OF SOOTBLOWING

Port	Distance Into Furnace	Temp.°C Before Blowing	Temp.°C After Blowing	Sootblowing Location
10W	8'	1120	1120	Furnace
9-1/2W	8'	1416	--	
9-1/2W	12'	1384	1370	Front of Superheater
9-1/2W	16'	1377	1351-62	Front of Superheater
9-1/2W	20'	1324	1315-32	Front of Superheater
9-1/2W	12'	1383	1370	Air Heater
	16'	1354	1351-62	
	20'	1345	1315-32	
	8'	1402	--	

5.0 REFERENCE

1. Manny, E. H. and A. R. Crawford. Control of Utility Boiler and Gas Turbine Pollutant Emissions by Combustion Modification - Phase II. EPA-600/7-81-039 (NTIS PB 81-222267), March 1981.

APPENDIX A

TEST PROCEDURES

Measurements performed by EER included the following:

- Flue gas composition of NO_x, O_2, CO, SO_2, and CO_2 by continuous monitors
- Coal and ash composition
- Furnace gas temperatures by suction pyrometer

Flue Gas Composition

The flue gas composition (NO_x, CO, CO_2, O_2, and SO_2) was monitored with continuous analyzers at the inlet of the air heater. Figure A-1 shows a schematic diagram of the monitoring system at the air heater inlet. The gas sample was obtained with eight sample probes. The gas sample flow rate from each probe is controlled with a glass rotameter to ensure equal flows through each probe. In addition, sampling can be conducted through one probe at a time to determine stratification of the gas concentrations. All components of the sample system upstream of the moisture condenser are heated. A separate sample stream for the SO_2 analyzer is dried with a Perma Pure drier. Moisture is removed from the condenser frequently using solenoid valves and a timer to minimize contact of moisture and the sample. All components of the system are stainless steel, Teflon, or glass to minimize possible reactions with the sample. The continuous monitoring instrumentation is listed in Table A-1.

FA-1

TA-1

Furnace Gas Temperature

Furnace gas temperatures were measured using a water-cooled suction pyrometer. A suction pyrometer was used due to the inaccuracies in high-temperature measurements caused by radiation loss from standard thermocouples. The suction pyrometer consists of a high-temperature thermocouple in a ceramic shield. A high flow rate of furnace gas is withdrawn through the shield and over the thermocouple so that convective heat transfer dominates, reducing the errors caused by radiation losses to an insignificant level. An air ejector is used to aspirate furnace gas. The

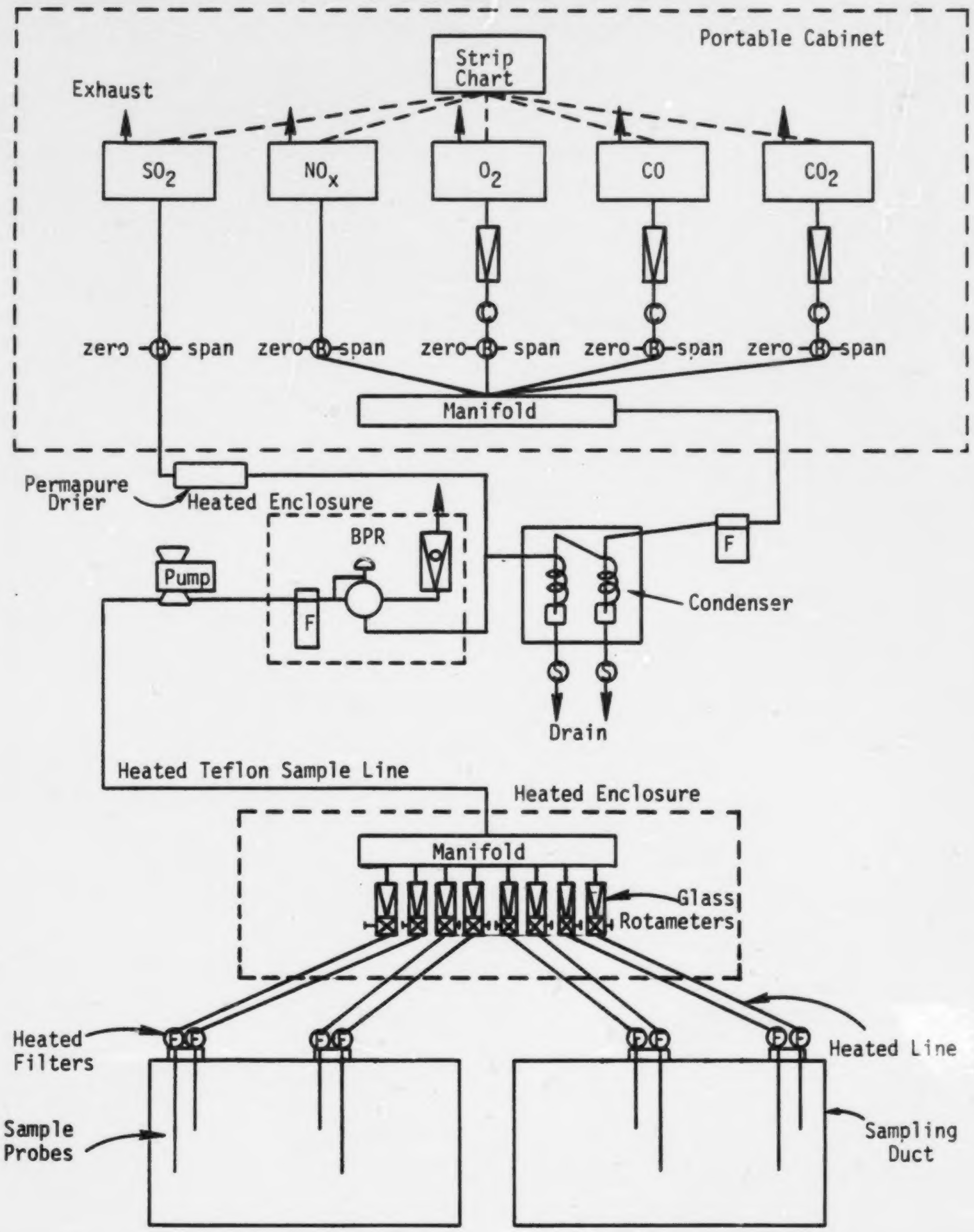

Portable Cabinet
Strip Chart
Exhaust
SO_2
NO_x
O_2
CO
CO_2
zero
span
zero
span
zero
span
zero
span
zero
span
Manifold
Permapure Drier
Heated Enclosure
BPR
Pump
F
F
Condenser
Drain
Heated Teflon Sample Line
Heated Enclosure
Manifold
Glass Rotameters
Heated Filters
Heated Line
Sample Probes
Sampling Duct

Figure A-1. Air heater inlet continuous monitoring system.

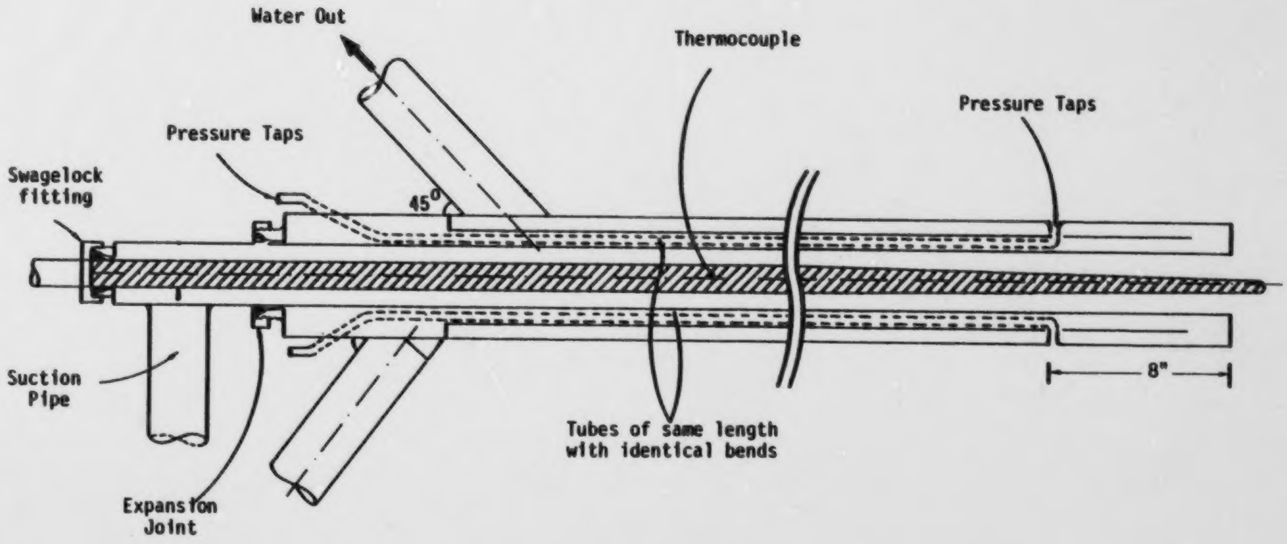
TABLE A-1. CONTINUOUS GAS ANALYZERS -- AIR HEATER INLET

Gas Measured	Detection Principle	Manufacturer	Model No.	Range	Nominal Calibration Gas Level
O_2	Paramagnetic	Taylor	OA570	10%	8%
SO_2	Pulsed Fluorescence	TECO	40	1000 ppm	800 ppm
NO_x	Chemiluminescent	TECO	10AR	1000 ppm	800 ppm
CO	Nondispersive Infrared	ANARAD	AR500R	500 ppm	400 ppm
CO_2	Nondispersive Infrared	ANARAD	AR500R	25%	22.5%

gas flow rate is monitored with a calibrated orifice to ensure an adequate gas velocity over the thermocouple. Temperatures are measured with K or S type thermocouples. Figure A-2 shows the design of the suction pyrometer probe. Figure A-3 shows the construction of the pyrometer tip.

Coal and Ash Characteristics

Samples of coal and ash were collected throughout the test program to determine chemical composition and physical characteristics. Coal samples were collected on a daily basis. Ash samples were obtained from the bottom hopper of the boiler, the precipitator hopper, and the high volume particulate sampler during the field tests. Solids analytical procedures are listed in Table A-2.



Water Out
Thermocouple
Pressure Taps
Pressure Taps
Swagelock fitting
45°
Suction Pipe
8"
Tubes of same length with identical bends
Expansion Joint

Figure A-2. Internal construction of water-cooled suction pyrometer probes.

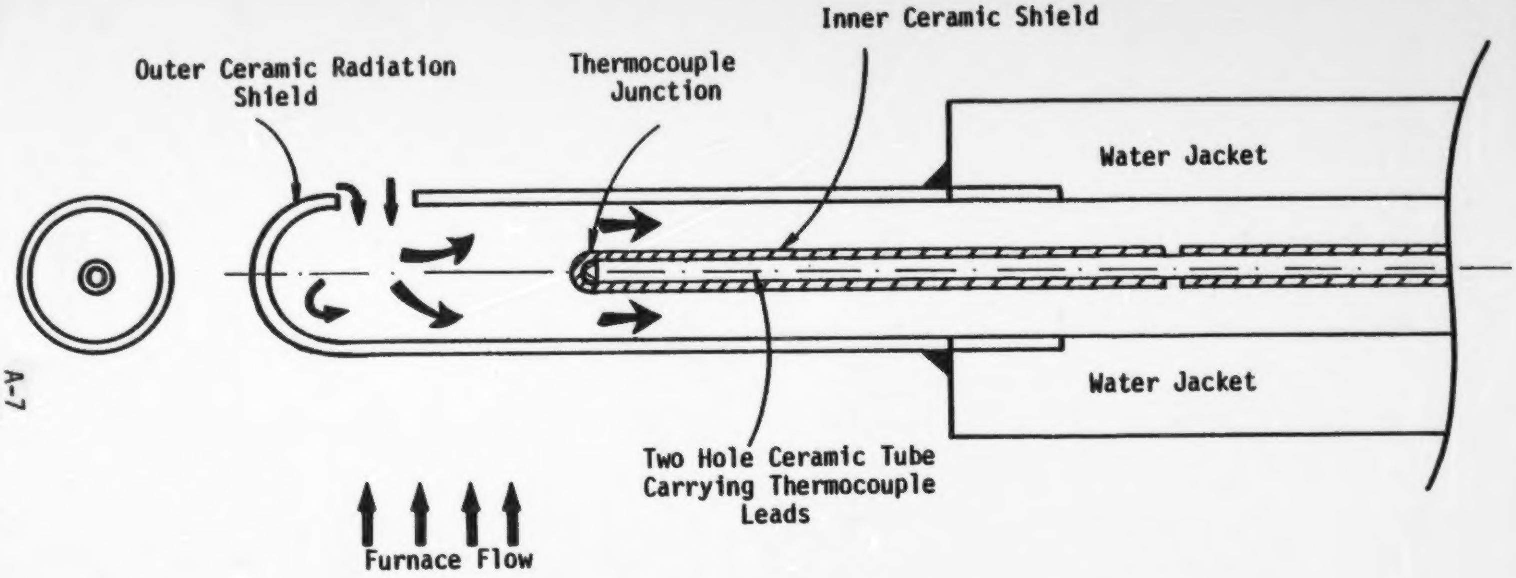

Outer Ceramic Radiation Shield
Thermocouple Junction
Inner Ceramic Shield
Water Jacket
Water Jacket
Two Hole Ceramic Tube Carrying Thermocouple Leads
Furnace Flow

Figure A-3. Suction pyrometer tip construction.

TABLE A-2. COAL AND ASH ANALYSES

Parameter	Analytical Procedure	Samples to be Analyzed	
		Coal	Ash
Proximate Analysis Volatiles, Fixed C, H_2O, Ash	ASTM D3172	X	
Heating Value	ASTM D2015	X	
Ultimate Analysis C, H, N, Ash, S	ASTM D3176	X	
Ultimate Analysis C, H, N, Ash	Perkin Elmer 240b Analyzer	X	X
Sulfur	Leco SC 32 Sulfur Analyzer	X	X
Ash	ASTM D3174	X	X

APPENDIX B

QUALITY ASSURANCE

Exhaust gas composition was measured using continuous monitors at the air heater gas inlet. This location was selected to allow flue gas stratification to be measured prior to dilution and mixing by the air heater. Routine quality control procedures included daily leak checks of the sampling system and calibration of the analyzers using standard compressed gas certified by the manufacturer to have an accuracy within 2 percent of the stated value.

Replicate calibrations were monitored as a measure of instrument precision. Precision was generally less than 2 percent. Data were corrected for instrument drift for the few occasions that precision exceeded 2 percent. The relative accuracy of NO_x, O_2 and CO_2 was evaluated using wet chemical analyses using EPA Reference Methods. NO_x concentrations were determined using grab samples collected in glass sample flasks in accordance with Method 7. Sampling was performed by EER and the analysis was performed by Truesdail Laboratories. Truesdail also analyzed the grab samples for CO_2 and O_2 using Method 3. Results of the relative accuracy measurement are shown in Tables B-1 and B-2. Relative accuracy of the NO_x emission rate in terms of lbs/10^6 Btu were well within the EPA performance specifications for continuous monitors of 20 percent. Some of the data for NO_x, O_2, and CO_2 on an as measured basis showed substantial differences compared to the continuous monitors. Those differences are due to gas stratification in the exhaust ducts. The Method 7 flasks obtain a grab sample at a single location over a period of a few seconds. Each of the twelve flasks collected at each boiler were obtained at different points in an attempt to obtain a representative sample. As can be seen in Table B-1, flasks collected in the west duct showed an O_2 concentration very close to the monitors, while the east duct samples showed a large difference, apparently due to variations in O_2 concentration between the two ducts. This variation was the cause of the apparent poor relative accuracy for O_2. Similar results were seen in Table B-2. Although the overall NO_x emission rate showed good instrument accuracy, the NO_x and O_2 concentrations showed poor accuracy apparently due to gas stratification at the sample points.

TABLE B-1. CONTINUOUS MONITORS RELATIVE ACCURACY CALCULATION
12-11-84 COMANCHE

Time	NO_x (ppm)				O_2 (%)			CO_2 (%)			NO_x (lbs/10^6 Btu)		
	RM	AVG RM	M	DIFF	RM	M	DIFF	RM	M	DIFF	RM	M	DIFF
0902	--	420	422	2	2.2	2.65	0.45	16.7	17.02	0.32	0.567	0.564	0.003
0904	366				3.6		0.95	16.3		0.72			
0907	473				2.7		0.05	16.4		0.62			
0912	431	410		12	2.3		0.35	16.6		0.42	0.540	0.564	0.024
0915	456				2.1		0.55	17.0		0.02			
0923	342				2.8		0.15	16.2		0.82			
1003	411	407	394	13	5.7	2.62	3.08	14.6	16.53	1.93	0.614	0.525	0.089
1006	410				3.9		1.28	15.3		1.23			
1008	399				4.7		2.08	14.8		1.73			
1012	337	377		17	4.2		1.58	14.9		1.63	0.562	0.525	0.037
1021	411				4.3		1.68	14.9		1.63			
1023	384				5.2		2.58	14.9		1.63			
Avg		404		11	3.6		1.23	15.7		1.06	0.571		0.038
Confidence Coefficient				10			0.63			0.41			0.058
Relative Accuracy				5.2			51.7			9.4			16.8

Grab Samples From West Duct (0902–0923)

Grab Samples From East Duct (1003–1023)

TABLE B-2. CONTINUOUS MONITORS RELATIVE ACCURACY CALCULATION
WYODAK 2-4-85

NO$_x$ (ppm)					O$_2$ (%)			CO$_2$ (%)			NO$_x$ (lbs/10^6 Btu)		
Time	RM	Avg RM	M	DIFF	RM	M	DIFF	RM	M	DIFF	RM	M	DIFF
1603	287	283	324	41	5.3	3.78	1.52	14.8	15.58	0.78	0.415	0.461	0.046
1609	279				3.3		0.48	15.8		0.22			
1614	290	292		32	5.5		1.72	15.6		0.02	0.431		0.030
1616	283				3.6		0.18	14.0		1.58			
1617	304				4.1		0.32	14.9		0.68			
1620	279	292		32	4.6		0.82	15.3		0.28	0.430		0.031
1620	304				4.1		0.32	14.9		0.68			
1623	261	275		49	5.5		1.72	14.7		0.88	0.417		0.044
1625	279				5.3		1.52	14.9		0.68			
1626	284				3.7		0.08	15.3		0.28			
Avg		285.5		38.5	4.5		0.87	15.0		0.61	0.423		0.038
Confidence Coefficient				13.0			0.49			0.32			0.013
Relative Accuracy				18.0			30.2			6.2			12.1

Quality assurance of the solids analysis by EER and Hagen includes analyses of audit samples provided by the EPA EMSL for coal. Figures B-1, B-2, and B-3 show the results of these analyses in terms of quality control charts.

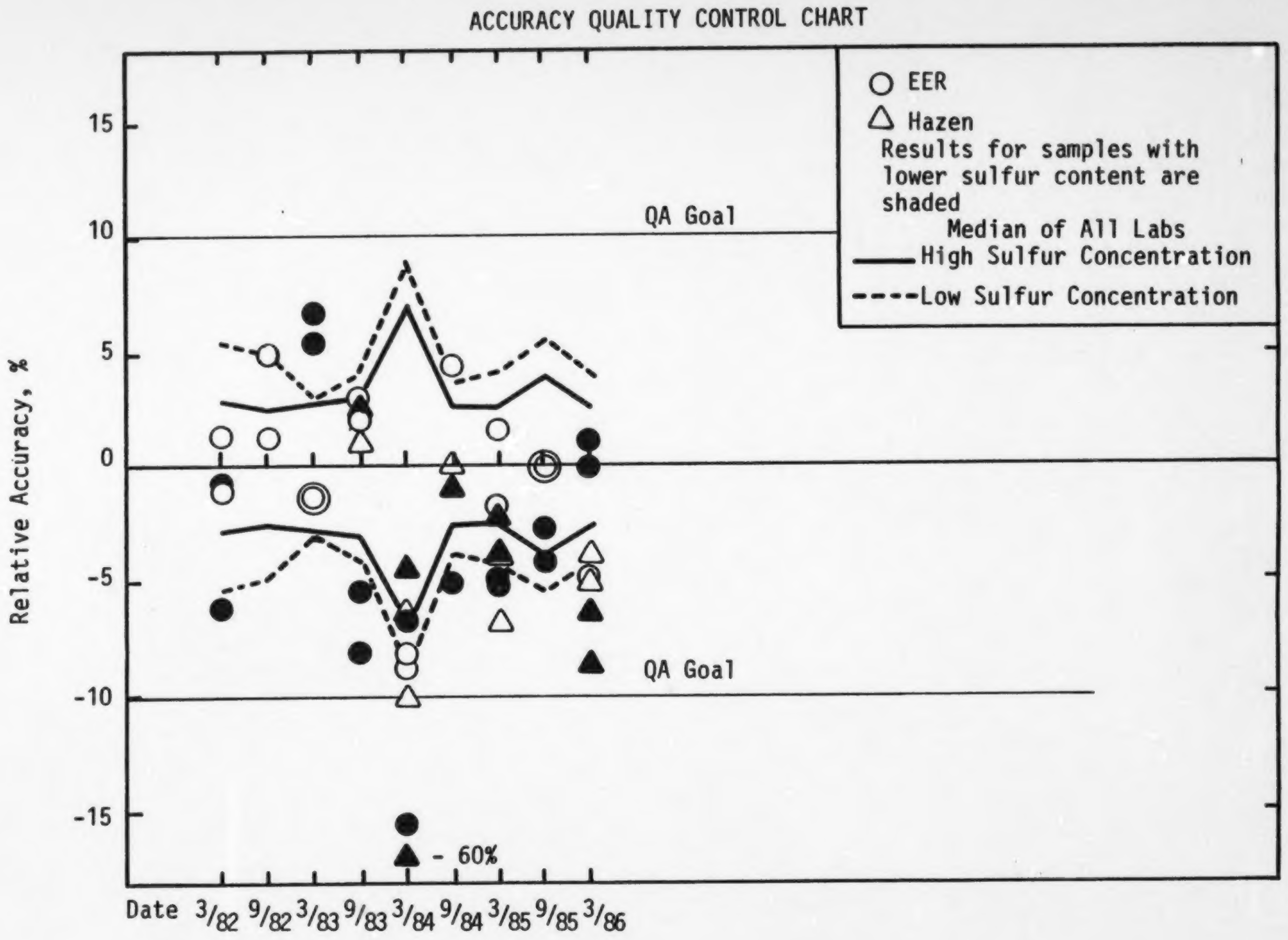


Figure B-1. EPA EMSL coal audit sulfur analysis.

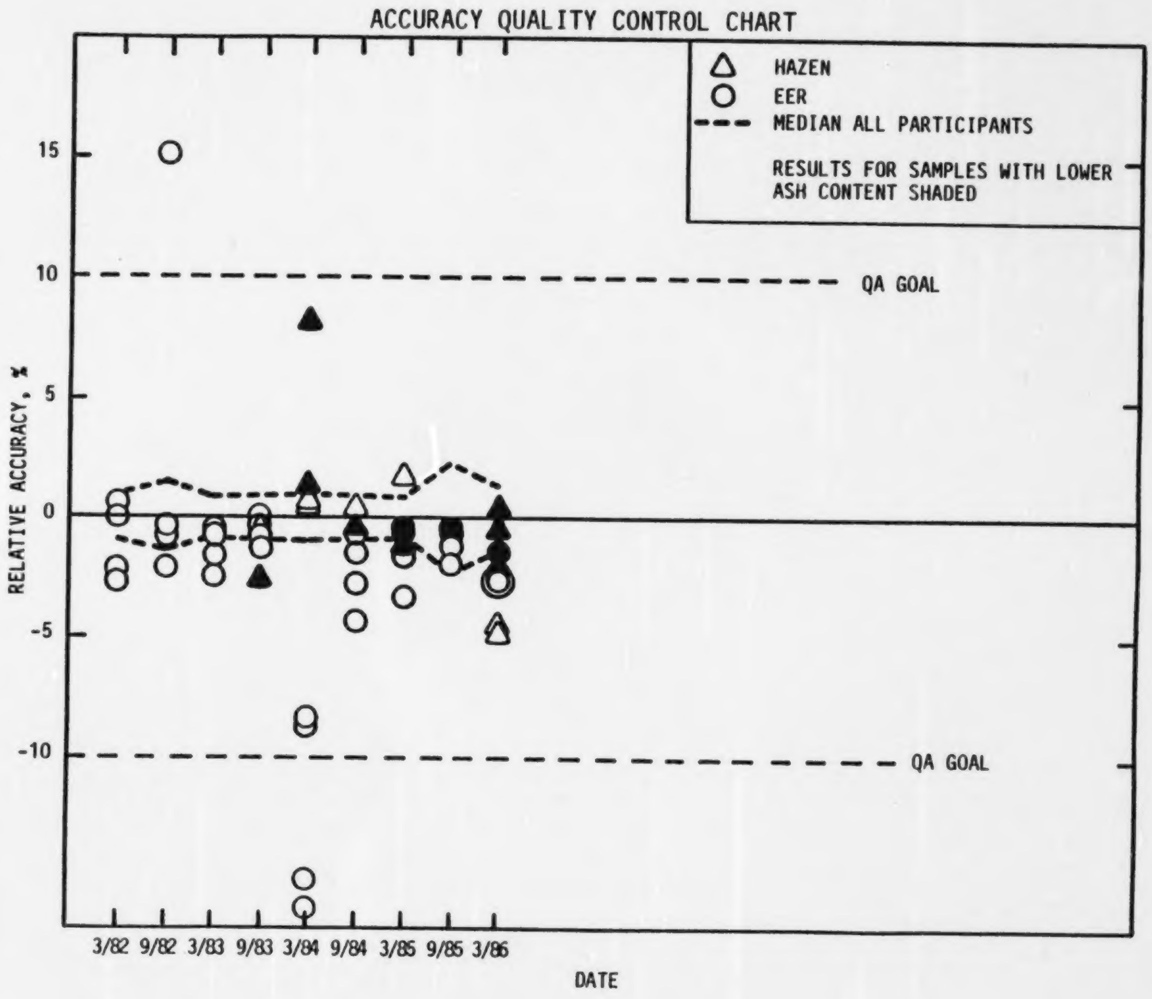


Figure B-2. EPA coal audit ash analysis.

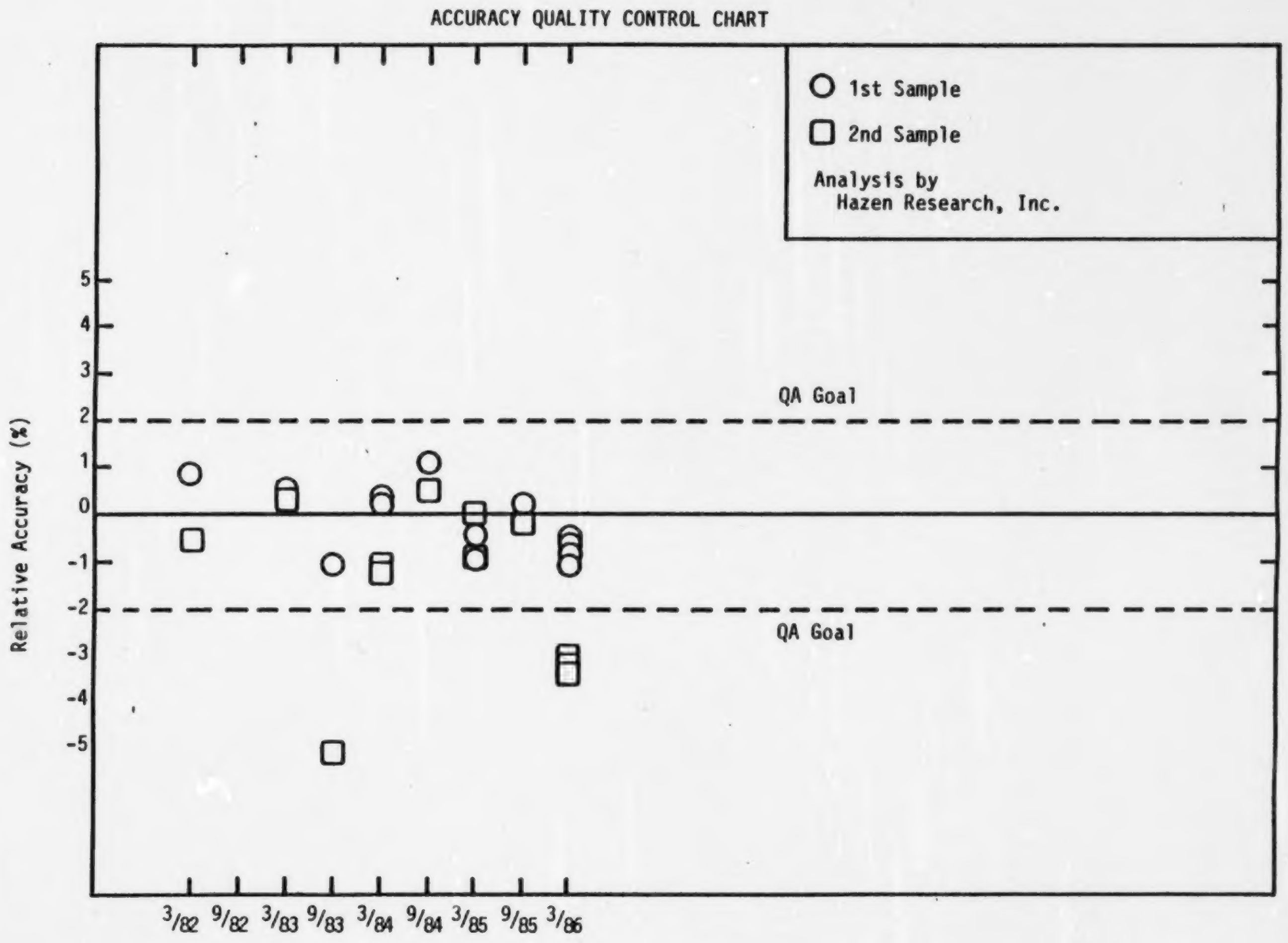


Figure B-3. EPA EMSL coal audit heating value analysis.

REPORT

TRUESDAIL LABORATORIES, INC.

CHEMISTS - MICROBIOLOGISTS - ENGINEERS
RESEARCH — DEVELOPMENT — TESTING

14201 FRANKLIN AVENUE
TUSTIN, CALIFORNIA 92680
AREA CODE 714 • 730-6239
AREA CODE 213 • 225-1564
CABLE: TRUELABS

CLIENT
Energy and Environmental Research
8001 Irvine Blvd.
Santa Ana, CA 92705
Attention: Jim Reese

DATE December 21, 1984
RECEIVED November 16, 1984
LABORATORY NO. 00358

SAMPLE
Preparation and shipment of NO_x Flasks to Pueblo, Co.

P.O. No. 28219

INVESTIGATION

Nitrogen Oxides

RESULTS

The submitted samples were analyzed for carbon dioxide (CO_2) and Oxygen (O_2) by Orsat and for nitrogen oxides (NO_x) by phenol disulfonic acid (PDSA) method. The results were as follows:

Sample I.D.	CO_2, %	O_2, %	NO_x, ppm dry
3606	14.9	4.3	411
1439	14.9	4.2	337
1090	14.9	5.2	384
1357	16.3	3.6	366
1377	14.6	5.7	411
1328	14.8	4.7	399
1437	15.3	3.9	410
612	17.0	2.1	456
611	16.6	2.3	431
1193	16.2	2.8	342
3330	16.7	2.2	*
1183	16.4	2.7	473

* Sample lost during analysis

Respectfully submitted,

TRUESDAIL LABORATORIES, INC.

S. Hugh Brown

S. Hugh Brown, Supervisor
Air Pollution Testing

This report applies only to the sample, or samples, investigated and is not necessarily indicative of the quality or condition of apparently identical or similar products. As a mutual protection to clients, the public and these Laboratories, this report is submitted and accepted for the exclusive use of the client to whom it is addressed and upon the condition that it is not to be used, in whole or in part, in any advertising or publicity matter without prior written authorization from these Laboratories.

NO_x SAMPLING DATA AND RESULTS

Sample No.	Date	MST Time	Voc-25ml (N.V.) Flask Vol Vf (ml)	Initial Barom. Press P_{bar_I} (in Hg)	Initial Man Vacuum $M/_I$ (Cm Hg)	Initial Flask Press P_I (mm Hg)	Initial Flask Temp T_I (°C)	Final Barom. Press P_{bar_F} (in Hg)	Final Man Vacuum M_F (Cm Hg)	Final Flask Press P_F (mm Hg)	Final Flask Temp T_F (°C)	Corr. Sample Vol Vsc (ml)	NO_2 in Sample (µg)	NO_x conc as NO_2, C (lbs/scf)	NO_x conc, C (ppm)
NO_x 1-W 3330	12/11/84	0902	2043	24.75											LOST
NO_x 2-W 1357		0904	2033												364
NO_x 3-W 1183		0907	2076												473
NO_x 4-W 611		0912	2040												431
NO_x 5-W 612		0915	2055												456
NO_x 6-W 1193		0923	2016												342
NO_x 1-E 1377		1003	2035												411
NO_x-2-E 1437		1006	2090												410
NO_x 3-E 1328		1008	2070												391
NO_x 4-E 1439		1012	2051												337
NO_x 5-E 3606		1021	2012												411
NO_x 6-E 1090		1023	1941												384

$$Vsc = 0.3858\ (V_F - 25)\left(\frac{P_F}{T_F} - \frac{P_I}{T_I}\right)$$

$$C\ (\text{lbs/scf}) = (6.243 \times 10^{-5})\ m\ /\ Vsc$$

$$C\ (\text{ppm}) = C\ (\text{lbs/scf})\ \frac{384.8}{46} \times 10^{6}$$

REPORT

TRUESDAIL LABORATORIES, INC.

CHEMISTS - MICROBIOLOGISTS - ENGINEERS
RESEARCH — DEVELOPMENT — TESTING

14201 FRANKLIN AVENUE
TUSTIN, CALIFORNIA 92680
AREA CODE 714 • 730-6239
AREA CODE 213 • 225-1564
CABLE: TRUELABS

CLIENT ENERGY AND ENVIRONMENTAL RESEARCH
8001 Irvine Blvd.
Santa Ana, CA 92705
ATTENTION: Jim Reese

DATE February 22, 1985
RECEIVED February 6, 1985
LABORATORY NO. 05516

SAMPLE
Preparation of 12 PDSA Flasks-Shipment to
Pacific Power and Light Plant in Wyoming
P.O. Number: 28976

INVESTIGATION
Nitrogen Oxides

RESULTS

The submitted samples were analyzed for nitrogen oxides (NO_x) by the phenoldisulfonic acid (PDSA) method, and for carbon dioxide (CO_2) and oxygen (O_2) by Orsat. The results were as follows:

Sample I.D.	CO_2, %	O_2, %	NO_x, ppm dry
1460	15.3	4.6	279
3473	14.9	4.1	304
1360	15.6	3.8	302
968	14.7	5.5	261
1413	15.8	3.3	279
1474	14.8	5.3	287
3253	14.2	12.1	250
610	14.0	3.6	283
619	15.3	3.7	284
626	14.9	5.3	279
*613			
1442	15.6	5.5	290

* No sample.

Respectfully submitted,

TRUESDAIL LABORATORIES, INC.

S. Hugh Brown

S. Hugh Brown, Supervisor
Air Pollution Testing

This report applies only to the sample, or samples, investigated and is not necessarily indicative of the quality or condition of apparently identical or similar products. As a mutual protection to clients, the public and these Laboratories, this report is submitted and accepted for the exclusive use of the client to whom it is addressed and upon the condition that it is not to be used, in whole or in part, in any advertising or publicity matter without prior written authorization from these Laboratories.

PROJ. NO.: 8516-30
PLANT: WYODAK
CITY: GILLETTE WYOMING

NO_x SAMPLING DATA AND RESULTS

Sample No.	Date	Time	TOTAL – 25ml Flask Vol Vf (ml)	Initial Barom. Press P_{bar_I} (in Hg)	Initial Man Vacuum $M/_I$ (Cm Hg)	Initial Flask Press P_I (mm Hg)	Initial Flask Temp T_I (°C)	Final Barom. Press P_{bar_F} (in Hg)	Final Man Vacuum M_F (Cm Hg)	Final Flask Press P_F (mm Hg)	Final Flask Temp T_F (°C)	Corr. Sample Vol Vsc (ml)	NO_2 in Sample (µg)	NO_x conc as NO_2, C (lbs/scf)	NO_x conc, C (ppm)
1A 1474	2/4/85	16:03	2083												
2A 3253	2/4/85	16:07	2005	NO	HISS										
3A 1413	2/4/85	16:09	2059												
1B 613	2/4/85	16:13	2034	NO	HISS										
2B 1442	2/4/85	16:14	2077												
3B 610	2/4/85	16:16	2013												
1C 1460	2/4/85	16:17	2089												
2C 3473	2/4/85	16:20	2009												
3C 1460	2/4/85	16:20	2089												
1D 968	2/4/85	16:27	2061												
2D 626	2/4/85	16:25	2037												
3D 619	2/4/85	16:26	2029												

$$Vsc = 0.3858\ (V_F - 25)\left(\frac{P_F}{T_F} - \frac{P_I}{T_I}\right)$$

$$C\ (\text{lbs/scf}) = (6.243 \times 10^{-5})\ m\ /\ Vsc$$

$$C\ (\text{ppm}) = C\ (\text{lbs/scf})\ \frac{384.8}{46} \times 10^6$$

GAS CONCENTRATION CALCULATION

Date 1-31-85 Operator ______________

Test No. 1-31-14 → 1-31-

Avg Gas Response, D_{avg}

Actual Gas Concentration, $Ga = (D_{avg} - Z_{avg}) \times G_s / (S_{avg} - Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21 - \%O_2)$

		NO$_x$			CO			CO$_2$			O$_2$			SO$_2$		
TIME	LOCATION	D_{avg}	G_A	G_A@0%	D_{avg}	G_A	G_A@0%	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	G_A@0%
1643	1-31-14 1K 33&34	33.3	291	356	11.5	35	43	68.3	15.73	19.26	43.5	3.85		50.5	456	558
1647	1-31-15 1K 35&36	32.7	284	349	14.5	50	62	68.3	15.73	19.32	44.0	3.90		49.0	441	541
1651	16 1K 37&38	32	277	339	18 ~~14.5~~	68 ~~50~~	83 ~~61~~	68.0	15.66	19.17	43.5	3.85		50.0	451	552
1655 1700	17 1K 39&40	32	277	343	18 ~~12.5~~	68 ~~40~~	83 ~~50~~	67.7	15.54	19.31	45.5	4.05		49.0	441	546
1700 1713	18 A/H sootblow 1A&B	32	277	340	18 ~~12.5~~	68 ~~40~~	83 ~~49~~	68	15.66	19.23	44	3.90		48.0	431	529
1800	1-31-19 Econo out	32.5	277	341	14.5	44	54	67.5	15.65	19.28	44.5	3.95		47	425	523
1900	1-31-20	33	282	338	17	56	68	68	15.77	18.93	40	3.50		41	364	437
20 00	21	32.3	275	340	18	62	76	68	15.77	19.55	45.5	4.05		39.0	344	426
21 00	22	35.0	302	376	15	46	58	68	15.77	19.66	46.5	4.15		38.5	339	422
22 00	23	32.0	271	340	15	46	58	67.5	15.65	19.62	47.5	4.25		39	344	431
23 00	1-31-24	34.0	292	366	13.5	37	49	67.5	15.65	19.62	47.5	4.25		40.5	359	450
24 00	1-31-25	32.5	277	349	12	31	40	67	15.52	19.58	48.5	4.35		41	364	459
1:00	1-31-26	33.5	287	360	12	31	39	67	15.52	19.52	48	4.30		44	394	496
2:00	1-31-27	33	282	355	12	31	40	67	15.52	19.58	48.5	4.35		43.5	389	491

* Moderate effect (coal related?) step change in NOx

A/H furnace sootblow test *

cal

coal change

GAS CONCENTRATION CALCULATION

Date 2-1-85 **Operator** D.C.
Test No.

Avg Gas Response, D_{avg}
Actual Gas Concentration, $Ga = (D_{avg} - Z_{avg}) \times G_s / (S_{avg} - Z_{avg})$
Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21 - \%O_2)$

	TIME	ECON. OUT. LOCATION	NO$_x$			CO			CO$_2$			O$_2$			SO$_2$		
			D_{avg}	G_A	G_A@0%	D_{avg}	G_A	G_A@0%	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	G_A@0%
	0810	2-1-1	33.5	280	354	11.0	35	44	65.8	15.15	19.14	49.0	4.38		46.0	417	527
cal	0835	2-1-2	33.5	280	354	11.0	35	44	66.0	15.20	19.20	49.0	4.38		48.0	438	553
	1120	2-1-3	36.2	309	385	10.5	28	35	67.8	15.61	19.45	46.5	4.15		40.2	357	444
12:00	1150 1210	2-1-4	37.5	322	399	10.4	27	34	67.8	15.61	19.34	45.5	4.05		43.5	390	483
13:00	1250	2-1-5	34.2	289	360	10.2	26	33	67.5	15.54	19.36	46.5	4.15		44.0	395	492
14:00	1350	2-1-6	36.5	312	386	9.8	24	30	67.5	15.54	19.25	45.5	4.05		46.0	415	515
SO$_2$ #3	1500	2-1-7	34.2	289	359	9.5	23	28	–	–	–	46.0	4.1		49.0	446	554
	1600	EAST ONLY 2-1-8	–	–	–	10.0	25	31	–	–	–	45.5	4.05		53.2	488	605
#4 SO$_2$	1615 1635	2-1-9	* strip chart 34.5	292	362	9.2	21	26	–	–	–	45.5	4.05		51.0	466	577
cal																	
	940 955	SO$_2$ #1	–			11.0			–			51.0	5.10		455	410	542

GAS CONCENTRATION CALCULATION

Date 2-1 2-2-85
Test No. 2-1-10 2-2-7

Operator ______________

Avg Gas Response, D_{avg}

Actual Gas Concentration, $G_a = (D_{avg} - Z_{avg}) \times G_s / (S_{avg} - Z_{avg})$

Gas Concentration @ 0%, $G_a@0\% = (G_A \times 21)/(21 - \%O_2)$

TIME	Econo Out	NOx b/v			CO or			CO_2 b/v			O_2 b/v			SO_2 v/o		
	LOCATION	D_{avg}	G_A	G_A@0%	D_{avg}	G_A	G_A@0%	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	G_A@0%
18 00	2-1-10	34	289	357	11.2	30	36	66.5	15.33	18.94	45.3	4.0		55.5	505	623
19 00	2-1-11	35	299	368	11.0	29	35	68.3	15.78	19.40	44.5	3.92		54.0	490	602
20 00	2-1-12	36	309	383	11.0	29	35	68.0	15.70	19.44	45.7	4.04		53.0	480	594
21 00	2-1-13	34.8	297	365	11.0	29	35	68.0	15.70	19.31	44.5	3.92		54.0	490	602
22 00	2-1-14	36.5	314	388	11.2	30	37	68.0	15.70	19.42	45.5	4.02		55.0	500	618
23 00	2-1-15	34.5	294	364	11.0	29	35	67.8	15.65	19.36	45.5	4.02		57.0	520	643
24 00	2-1-16	34.8	297	367	11.0	29	35	68.0	15.70	19.42	45.5	4.02		58.5	535	661
100	2-2-1	36.7	316	390	11.0	29	35	68.0	15.70	19.42	45.5	4.02		64.5	595	736
2 00	2-2-2	36.5	314	387	11.2	30	36	67.7	15.63	19.27	45.0	3.97		64.0	590	727
3 00	2-2-3	34.5	297	370	11.0	29	36	67.5	15.58	19.41	46.8	4.15		61.0	560	698
4 00	2-2-4	34.8	297	368	11.0	29	35	68	15.70	19.46	45.8	4.05		60.5	555	687
5 00	2-2-5	35.8	307	380	11.0	29	35	68	15.70	19.42	45.5	4.02		60	550	680
6 00	2-2-6	34.5	294	363	11.5	31	38	68.2	15.75	19.43	45.0	3.97		58	530	653
7:00 cal	2-2-7	34.0	289	354	14.0	44	54	68.7	15.88	19.46	44.0	3.87		57.5	525	643

GAS CONCENTRATION CALCULATION

Date 2-2-85 Operator D.C.

Test No.

Avg Gas Response, Davg

Actual Gas Concentration, Ga = $(D_{avg}-Z_{avg}) \times G_s/(S_{avg}-Z_{avg})$

Gas Concentration @ 0%, Ga@0% = $(G_A \times 21)/(21-\%O_2)$

	ECON. OUT.	NO$_x$			CO			CO$_2$			O$_2$			SO$_2$		
TIME	LOCATION	D$_{avg}$	G$_A$	G$_A$@0%	D$_{avg}$	G$_A$	G$_A$@0%	D$_{avg}$	GA	Ga@0%	D$_{avg}$	Ga	Ga@0%	D$_{avg}$	G$_A$	G$_A$@0%
1040	2-2-8	33.5	284	349	12.5	40	50	67.5	15.57	19.12	44.0	3.90		63.0	583	716
* 1112	SO$_2$ # 5 2-2-9	32.5	274	336	13.2	44	54	67.8	15.64	19.21	44.0	3.90		62.8	581	713
1130	2-2-10	33.0	279	342	13.5	45	56	68.0	15.69	19.22	43.5	3.85		62.0	573	701
* 1206	SO$_2$ # 6 2-2-11	33.5	284	347	12.5	40	49	68.0	15.69	19.18	43.2	3.82		61.5	568	694
1224	2-2-12	35.0	299	368	11.5	35	44	67.5	15.57	19.19	44.6	3.96		65.0	603	793
1300 * 1403	SO$_2$ # 7 2-2-13	35.5 34.2	303 291	373 355	11.5 14.5	35 50	44 62	67.5 67.8	15.57 15.64	19.19 19.10	44.6 43.0	3.96 3.80		65 67.5	603 628	743 767
1423	2-2-14	35.0	299	367	14.8	52	64	68.0	15.69	19.27	44.0	3.90		67.5	628	772
* 1451	SO$_2$ # 8 2-2-15	35.6	305	374	13.5	45	56	67.5	15.57	19.12	44.0	3.90		67.5	628	772

* SO$_2$ RUN

GAS CONCENTRATION CALCULATION

Date 2-2-85 Operator D.C.

Test No. ______

Avg Gas Response, D_{avg}

Actual Gas Concentration, $G_a = (D_{avg} - Z_{avg}) \times G_s / (S_{avg} - Z_{avg})$

Gas Concentration @ 0%, $G_a@0\% = (G_A \times 21)/(21 - \%O_2)$

	ECON. OUT	NO_x			CO			CO_2			O_2			SO_2		
TIME	LOCATION	D_{avg}	G_A	G_A@0%	D_{avg}	G_A	G_A@0%	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	G_A@0%
1550	2-2-16	33.8	292	359	14.0	41	51	67.2	15.16	1864	44.2	3.92		70.5	663	816
1652	2-2-17	34.0	294	362	11.5	29	35	68.5	15.48	19.08	44.6	3.96		68.0	638	786
1752	2-2-18	33.8	292	359	11.8	30	37	69.0	15.60	19.18	44.2	3.92		67.0	628	772
1852	2-2-19	33.5	289	356	11.2	27	33	69.0	15.60	19.22	44.5	3.95		64.5	603	742
1952	2-2-20	35.2	306	376	13.5	39	47	69.4	15.70	19.28	44.0	3.90		61.5	572	703
2052	2-2-21	34.8	302	373	13.0	36	45	69.0	15.60	19.27	45.0	4.00		59.5	552	682
2152	2-2-22	34.5	299	366	14.0	41	50	69.3	15.68	19.19	43.5	3.45		59.0	547	670
2252	2-2-23	35.6	310	383	NO INK	–	–	69.2	15.65	19.31	44.8	3.98		56.5	522	644
2352	2-2-24	33.5	289	356	"	-	-	69.0	15.60	19.22	44.5	3.95		60.5	562	693
0052	2-3-1	33.8	292	359	"	-	-	69.5	15.73	19.37	44.5	3.95		61.0	567	699
0152	2-3-2	33.6	290	357	"	-	-	69.3	15.68	19.31	44.5	3.95		61.5	572	705
0252	2-3-3	35.2	306	379	"	-	-	69.2	15.65	19.39	45.5	4.05		59.7	554	687
0352	2-3-4	32.0	274	345	"	–	–	68.0	15.35	19.37	48.5	4.35		58.5	542	684

GAS CONCENTRATION CALCULATION

Date 2-3-85

Test No. ________

Operator D.C

Avg Gas Response, D_{avg}

Actual Gas Concentration, Ga = $(D_{avg}-Z_{avg}) \times G_s/(S_{avg}-Z_{avg})$

Gas Concentration @ 0%, Ga@0% = $(G_A \times 21)/(21-\%O_2)$

TIME	LOCATION	NO_x			CO			CO_2			O_2			SO_2		
		D_{avg}	G_A	G_A@0%	D_{avg}	G_A	G_A@0%	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	G_A@0%
0452	2-3-5	33.3	287	357	NO INK	–	–	69.0	15.60	19.41	46.2	4.12		58.5	542	674
0552	2-3-6	33.9	293	360	〃	–	–	69.5	15.73	19.31	44.0	3.90		59.5	552	678
0652	2-3-7	31.8	272	336	〃	–	–	69.4	15.70	19.39	45.0	4.00		58.5	542	670
0752	2-3-8	32.4	278	342	〃	–	–	70.0	15.85	19.52	44.5	3.95		61.0	567	699

GAS CONCENTRATION CALCULATION

Date 2-3-85 Operator D.C

Test No. ________

Avg Gas Response, D_{avg}

Actual Gas Concentration, $Ga = (D_{avg} - Z_{avg}) \times G_s / (S_{avg} - Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21 - \%O_2)$

	TIME	LOCATION	NO$_x$			CO			CO$_2$			O$_2$			SO$_2$		
			D_{avg}	G_A	G_A@0%	D_{avg}	G_A	G_A@0%	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	G_A@0%
11:00	1050	2-3-9	33.2	282	345	17.5	64	78	67.5	15.62	19.07	42.8	3.80		69.0	648	792
12:00	1152	2-3-10	34.4	294	367	15.5	54	67	67.0	15.50	19.33	46.5	4.17		68.5	643	803
13:00	1252	2-3-11	32.0	270	337	14.0	47	58	66.8	15.45	19.28	46.6	4.18		72.0	679	848
14:00	1352	2-3-12	34.0	290	358	16.0	57	70	67.6	15.64	19.32	44.8	4.00		73.6	695	859
15:00	1452	2-3-13	33.6	286	355	13.0	42	51	67.5	15.62	19.37	45.5	4.07		76.5	725	899
16:00	1552	2-3-14	34.0	290	358	13.0	42	51	67.9	15.72	19.38	44.5	3.97		77.0	730	900
17:00	1652	2-3-15	32.5	275	341	13.0	42	51	67.8	15.69	19.43	45.2	4.04		77.0	730	903
18:00	1752	2-3-16	33.2	282	348	14.0	47	57	68.0	15.74	19.44	44.7	3.99		77.5	735	907
19:00	1852	2-3-17	32.2	272	337	14.0	47	58	67.9	15.72	19.44	45.0	4.02		80.0	760	940
20:00	1952	2-3-18	34.1	291	359	14.5	49	61	68.0	15.74	19.41	44.5	3.97		81.0	770	950
21:00	2052	2-3-19	32.3	273	338	14.0	47	58	68.0	15.74	19.47	45.0	4.02		82.5	785	971
22:00	2152	2-3-20	33.7	287	356	15.0	52	64	67.8	15.69	19.46	45.5	4.07		84.0	801	993
23:00	2252	2-3-21	33.5	285	354	14.5	49	61	67.8	15.69	19.46	45.5	4.07		87.0	831	1031

GAS CONCENTRATION CALCULATION

Date 2-3-85 Operator D.C.

Test No. ______

Avg Gas Response, D_{avg}.

Actual Gas Concentration, $Ga = (D_{avg} - Z_{avg}) \times G_s / (S_{avg} - Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21 - \%O_2)$

	TIME	LOCATION	NO$_x$			CO			CO$_2$			O$_2$			SO$_2$		
			D_{avg}	G_A	G_A@0%	D_{avg}	G_A	G_A@0%	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	G_A@0%
2400	2352	2-3-22	32.8	278	347	14.5	49	61	67.5	15.62	19.49	46.5	4.15 ~~15.62~~		87.0	831	1036
1	0052	2-4-1	37.0	280	349	19.5	74	92	67.5	15.62	19.43	46.0	4.12		87.0	831	1034
2	0152	2-4-2	34.2	292	365	15.0	52	64	67.5	15.62	19.52	46.8	4.20		85.0	811	1014
3	0252	2-4-3	37.0	280	348	14.0	47	58	67.0	15.50	19.28	NO(4) INK	(4.12)*		84.5	806	1002
4	0352	2-4-4	33.0	280	348	14.5	49	61	67.2	15.55	19.34	"	↓		82.5	785	977
5	0452	2-4-5	31.3	263	327	16.0	57	71	67.5	15.62	19.43	"			82.5	785	977
6	0552	2-4-6	32.6	276	343	16.5	59	73	67.5	15.62	19.43	"			83.0	791	984
7:00	0652	2-4-7	34.5	295	367	13.5	44	55	67.2	15.55	19.34	"			82.0	780	971

*BASED ON CO2

GAS CONCENTRATION CALCULATION

Date 2-4-85
Test No. ____________
Operator D.C.

Avg Gas Response, Davg
Actual Gas Concentration, Ga = $(D_{avg}-Z_{avg}) \times G_s/(S_{avg}-Z_{avg})$
Gas Concentration @ 0%, Ga@0% = $(G_A \times 21)/(21-\%O_2)$

TIME	LOCATION	NO$_x$			CO			CO$_2$			O$_2$			SO$_2$		
		D$_{avg}$	G$_A$	G$_A$@0%	D$_{avg}$	G$_A$	G$_A$@0%	D$_{avg}$	GA	Ga@0%	D$_{avg}$	Ga	Ga@0%	D$_{avg}$	G$_A$	G$_A$@0%
0938	2-4-8	32.8	272	337	18.0	67	83	67.2	15.45	19.00 ~~16.49~~	45.8	4.07		81.5	774	961
* 1005	SO$_2$ #9 2-4-9	33.5	279	346	23.0	92	114	67.6	15.55	19.32	46.0	4.09		81.0	769	955
1020	2-4-10	33.6	280	347	16.5	59	73	67.5	15.53	19.23	45.5	4.04		80.8	759	940
* 1054	SO$_2$ #10 2-4-11	33.4	278	345	15.5	54	67	67.5	15.53	19.29	46.0	4.09		80.8	759	943
1109	2-4-12	33.5	279	345	15.0	52	64	67.5	15.53	19.23	45.5	4.04		78.0	739	915
* 1143	SO$_2$ #11 2-4-13	34.5	289	355	15.0	52	64	67.8	15.60	19.21	44.5	3.94		76.5	724	891
1224	2-4-14	35.5	299	368	15.0	52	64	68.5	15.78	19.42	44.5	3.94		74.0	698	860
1316	2-4-15	33.5	279	343	13.0	42	51	68.5	15.78	19.42	44.5	3.94		70.5	663	816
* 1402	SO$_2$ #12 2-4-16	34.8	292	359	13.0	42	51	69.0	15.90	19.60	44.7	3.96		65.0	607	748
1422	2-4-17	35.5	299	370	11.5	34	42	NO INK	—	—	45.5	4.04		62.5	582	720
1500 1546	2-4-18	36 31.8	303 262	376 326	11.0 11.0	31 31	35 39	— 67.0	— 15.40	— 19.19	46 46.5	4.09 4.14		60 60.5	556 562	690 699

* SO$_2$

DUP

GAS CONCENTRATION CALCULATION

Date 2-4-85
Test No.
Operator D.C.

Avg Gas Response, D_{avg}
Actual Gas Concentration, $Ga = (D_{avg} - Z_{avg}) \times G_s / (S_{avg} - Z_{avg})$
Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21 - \%O_2)$

TIME	LOCATION	NO_x			CO			CO_2			O_2			SO_2		
		D_{avg}	G_A	G_A@0%	D_{avg}	G_A	G_A@0%	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	G_A@0%
2-4-19 * 1603	NOx SET "A"	37.5	324	395	10.8	29	36	67.5	15.58	19.00	43.0	3.78		63.5	592	722
2-4-20 * 1612	SET "B"	38.0	329	397	10.5	28	34	69.0	15.95	19.25	41.2	3.60		64.5	605	731
2-4-21 * 1617	SET "C"	37.9	328	400	11.2	31	38	68.8	15.90	19.42	43.2	3.80		62.0	577	705
2-4-22 * 1623	SET "D"	38.2	331	405	11.0	30	37	67.7	15.63	19.15	43.8	3.86		61.5	572	701

* NOx SETS

GAS CONCENTRATION CALCULATION

Date 2-4-85 Operator D. C.

Test No. ______

Avg Gas Response, Davg

Actual Gas Concentration, $Ga = (D_{avg} - Z_{avg}) \times G_s/(S_{avg} - Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21 - \%O_2)$

TIME	LOCATION	NO_x			CO			CO_2			O_2			SO_2		
		D_{avg}	G_A	G_A@0%	D_{avg}	G_A	G_A@0%	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	G_A@0%
* 1603	NOx SET "A" 2-4-19	37.5	324	395	10.8	29	36	67.5	15.58	19.00	43.0	3.78		63.5	592	722
* 1612	NOx SET "B" 2-4-20	38.0	329	397	10.5	28	34	69.0	15.95	19.25	41.2	3.60		64.8	605	731
* 1617	NOx SET "C" 2-4-21	37.9	328	400	11.2	31	38	68.8	15.90	19.42	43.2	3.80		62.0	577	705
* 1623	NOx SET "D" 2-4-22	38.2	331	405	11.0	30.	37	67.7	15.63	19.15	43.8	3.86		61.5	572	701
1626	2-4-23	37.2	315	387	12.0	37	45	68.3	15.73	19.31	44.0	3.89		60.5	562	690
1700 1720	2-4-24	36.8 36.8	316 316	388 387	12.0 12.0	36 36	44 43	67.6 67.6	15.61 15.61	19.16 19.10	44 43.7	3.89 3.84		59 58.5	558 553	685 676
1800	2-4-25	37.5	323	395	14.5	48	59	69.0	15.96	19.51	43.5	3.82		55.0	516	631
1950	2-4-26	36.5	313	384	11.5	33	40	69.0	15.96	19.57	44.0	3.87		53.5	501	614
2050	2-4-27	36.5	313	380	12.5	38	46	69.5	16.09	19.49	42.0	3.67		54.0	506	613
2150	2-4-28	35.0	298	364	11.0	30	37	69.0	15.96	19.48	43.2	3.79		50.0	465	567
2250	2-4-29	36.6	314	383	11.0	30	37	69.0	15.96	19.45	43.0	3.77		48.5	449	548
2350	2-4-30	36.0	308	379	10.6	28	35	68.5	15.84	19.47	44.5	3.92		46.0	423	521
0050	2-5-1	36.0	308	377	11.2	31	38	69.0	15.96	19.51	43.5	3.82		47.0	434	530

5 MILLS ON

* NOx SETS

GAS CONCENTRATION CALCULATION

Date 2-5-85

Test No. ______

Operator D.C.

Avg Gas Response, D_{avg}

Actual Gas Concentration, $Ga = (D_{avg} - Z_{avg}) \times G_s / (S_{avg} - Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21 - \%O_2)$

TIME	LOCATION	NO_x			CO			CO_2			O_2			SO_2		
		D_{avg}	G_A	G_A@0%	D_{avg}	G_A	G_A@0%	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	G_A@0%
0150	2-5-2	35.5	303	373	10.8	29	36	68.5	15.84	19.47	44.5	3.92		46.5	429	527
0250	2-5-3	36.5	313	381	11.0	30	37	69.0	15.96	19.43	42.8	3.75		48.0	444	541
0350	2-5-4	37.8	326	396	NO INK	[illegible]	[illegible]	69.0	15.96	19.38	42.4	3.71		50.0	415	564
0450	2-5-5	36.0	308	374	11	[illegible]	—	69.0	15.96	19.34	42.0	3.67		48.5	449	544
0550	2-5-6	36.4	312	378	NO INK	—	—	69.2	16.01	19.40	NO INK	$\boxed{3.67}$* ←		47.0	434	526
0650	2-5-7	36.5	313	380	11	—	—	69.2	16.01	19.40	11	$\boxed{3.67}$*		48.5	449	544

* Based on CO_2

GAS CONCENTRATION CALCULATION

Date 2-5-85 Operator D.C

Test No. ______

Avg Gas Response, D_{avg}

Actual Gas Concentration, $Ga = (D_{avg} - Z_{avg}) \times G_s / (S_{avg} - Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21 - \%O_2)$

TIME	LOCATION	NO$_x$			CO			CO$_2$			O$_2$			SO$_2$		
		D_{avg}	G_A	G_A@0%	D_{avg}	G_A	G_A@0%	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	G_A@0%
0850	2-5-8	35.0	299	363	11.2	34	42	67.8	15.60	18.94	42.0	3.70		52.0	473	574
0950	2-5-9	34.8	297	360	11.5	36	44	68.0	15.65	18.95	41.6	3.66		51.0	463	561
1050	2-5-10	35.8	307	374	10.5	31	38	68.6	15.80	19.24	42.6	3.76		50.5	458	558
1150	2-5-11	36.3	312	379	11.6	31	38	68.0	15.90	19.30	42.0	3.70		49.0	443	537
1250	2-5-12	35.6	305	371	10.0	28	35	69.2	15.95	19.41	42.5	3.75		52.5	478	582
1350	2-5-13	36.0	309	375	9.9	28	34	70.5	16.27	19.75	42.0	3.70		55.0	503	611
* 1450	ANDERSEN-1 2-5-14	36.5	314	385	9.0	23	29	69.0	15.90	19.50	43.8	3.88		62.5	579	710
1550	2-5-15	34.4	293	360	9.9	28	34	69.0	15.90	19.52	44.0	3.90		68.5	639	785
1700 1750	2-5-16	38 37.0	330 320	402 391	11.5 12.2	30 34	37 41	68 69.4	15.38 15.72	18.76 19.17	43 43.0	3.78 3.78		65 64.5	601 596	735 726
1850	2-5-17	37.9	329	402	11.5	30	37	70.0	15.86	19.37	43.2	3.80		63.5	586	715
1950	2-5-18	37.5	325	397	11.7	31	38	70.2	15.91	19.41	43.0	3.78		68.8	631	769
2050	2-5-19	39.3	343	420	11.2	29	35	70.0	15.86	19.40	43.5	3.83		72.0	671	820
2150	2-5-20	33.2	282	347	12.5	35	44	69.5	15.74	19.37	44.5	3.93		75.0	701	862

* ANDERSEN

GAS CONCENTRATION CALCULATION

Date 2-5-85

Test No. ______

Operator D.C.

Avg Gas Response, D_{avg}

Actual Gas Concentration, $G_a = (D_{avg} - Z_{avg}) \times G_s / (S_{avg} - Z_{avg})$

Gas Concentration @ 0%, $G_a@0\% = (G_A \times 21)/(21 - \%O_2)$

	TIME	LOCATION	NO_x			CO			CO_2			O_2			SO_2		
			D_{avg}	G_A	G_A@0%	D_{avg}	G_A	G_A@0%	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	G_A@0%
2/5	2250	2-5-21	34.6	296	364	15.0	48	59	70.0	15.86	19.48	44.2	3.90		77.0	721	885
	2350	2-5-22	34.2	292	362	12.3	34	43	69.8	15.82	19.57	45.5	4.03		77.5	726	898
≡	0050	2-6-1	32.7	277	341	14.5	45	56	69.9	15.84	19.49	44.5	3.93		77.0	721	887
	0150	2-6-2	32.4	274	338	12.5	35	44	70.0	15.86	19.57	45.0	3.98		76.0	711	877
	0250	2-6-3	32.7	277	341	14.6	45	56	70.3	15.94	19.62	44.6	3.99		73.5	686	844
2/6	0350	2-6-4	33.4	284	349	13.0	38	46	70.5	15.99	19.61	44.0	3.88		74.0	691	847
	0450	2-6-5	34.2	292	362	13.5	40	50	70.2	15.91	19.69	45.5	4.03		73.0	681	843
	0550	2-6-6	32.2	272	336	13.0	38	47	70.2	15.91	19.63	45.0	3.98		73.0	681	840
	0650	2-6-7	31.8	268	331	13.0	38	47	70.0	15.86	19.57	45.0	3.98		70.0	651	803
	0934	2-6-8	31.1	268	321	12.5	40	50.	67.0	14.95	18.46	45.2	4.00		71.0	668	825
	1100	2-6-9	30.5	254	315	12.8	42	52	68.8	15.38	19.07	45.8	4.06		75.0	708	878
	1150	2-6-10	31.0	259	318	13.0	43	53	68.5	15.31	18.83	44.5	3.93		76.5	724	890
	1115	2-6-11	31.8	267	330	13.5	45	56	68.2	15.24	18.85	45.5	4.03		80.0	759	939

D off

GAS CONCENTRATION CALCULATION

Date 2-6-85 Operator D.C.

Test No. ____

STRATIFICATION TEST

Avg Gas Response, Davg

Actual Gas Concentration, $Ga = (D_{avg} - Z_{avg}) \times G_s / (S_{avg} - Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21 - \%O_2)$

TIME	LOCATION	NO$_x$			CO			CO$_2$			O$_2$			SO$_2$		
		D$_{avg}$	G$_A$	G$_A$@0%	D$_{avg}$	G$_A$	G$_A$@0%	D$_{avg}$	GA	Ga@0%	D$_{avg}$	Ga	Ga@0%	D$_{avg}$	G$_A$	G$_A$@0%
0934	ALL PROBES 2-6-8	31.1	260	321	12.5	40	50	67.6	14.95	18.46	45.2	4.00		71.0	668	825
1003	Long PROBE # 1	29.5	244	300	10.6	31	38	67.5	15.07	18.57	44.8	3.96		78.0	739	911
1010	PROBE # 2	30.5	254	300	11.2	34	40	70.0	15.67	18.52	37.5	3.23		—		
1014	Long PROBE # 3	31.8	267	342	10.3	29	37	65.2	14.51	18.62	51.6	4.64		74.0	698	896
1021	PROBE # 4	32.2	271	334	11.5	35	43	68.7	15.36	18.95	45.0	3.98		79.5	754	930
1025	Long PROBE # 5	33.0	279	365	12.4	40	52	64.0	14.22	18.63	55.0	4.97		—		
1031	PROBE # 6	31.4	263	333	11.5	35	45	66.4	14.80	18.75	49.5	4.43		—		
1035	Long PROBE # 7	31.8	267	335	16.0	58	73	67.5	15.07	18.92	48.0	4.28		—		
1041	PROBE # 8	32.2	271	344	11.0	33	41	67.5	15.07	19.15	50.0	4.48		—		
* 1100	ALL PROBES EX. 3 & 4 2-6-8	30.5	254	315	12.8	42	52	68.8	15.38	19.07	45.8	4.06		75.0	708	878

GAS CONCENTRATION CALCULATION

Date 2-6-85
Test No. ________
Operator D.C.

Avg Gas Response, D_{avg}
Actual Gas Concentration, $Ga = (D_{avg}-Z_{avg}) \times G_s/(S_{avg}-Z_{avg})$
Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21-\%O_2)$

TIME	LOCATION	NO_x			CO			CO_2			O_2			SO_2		
		D_{avg}	G_A	G_A@0%	D_{avg}	G_A	G_A@0%	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	G_A@0%
1300	2-6-12	32.0	269	330	12.5	40	49	69.5	15.55	19.07	44.0	3.88		89.5	855	1049
1400	2-6-13	32.5	274	337	12.5	40	50	68.2	15.24	18.77	44.8	3.96		87.0	830	1023
1500	2-6-14	32.0	269	331	12.5	40	50	68.5	15.31	18.86	44.8	3.96		93.5	896	1104
1600	2-6-15	31.8	267	328	11.5	35	43	69.2	15.48	19.04	44.5	3.93		93.0	891	1096
1800	2-6-16	34.0	289	357	15.5	55	69	67.2	14.99	18.55	45.5	4.03		83.0	794	982
1900	2-6-17	31.5	264	327	13.5	45	56	67.2	14.99	18.61	46.0	4.08		80.0	763	947
2000	2-6-18	33.6	285	354	13.6	46	57	67.2	14.99	18.66	46.5	4.13		82.5	788	981
2100	2-6-19	32.0	269	335	14.5	50	63	67.0	14.95	18.63	46.8	4.16		85.0	814	1015
2200	2-6-20	32.8	277	345	16.0	58	72	67.2	14.99	18.66	46.5	4.13		82.5	788	981
2300	2-6-21	31.8	267	332	15.5	55	69	67.5	15.07	18.75	46.5	4.13		82.0	783	975
2400	2-6-22	33.0	279	348	15.3	54	68	67.5	15.07	18.79	46.8	4.16		81.5	778	971
0100	2-7-1	32.8	276	343	15.5	44	54	67.5	15.56	19.33	45.8	4.10		80.0	763	948
0200	2-7-2	31.8	266	330	15.5	44	54	67.8	15.64	19.39	45.5	4.07		82.0	783	972

GAS CONCENTRATION CALCULATION

Date 2-7-85

Test No.

Operator D.C.

Avg Gas Response, D_{avg}

Actual Gas Concentration, $Ga = (D_{avg}-Z_{avg}) \times G_s/(S_{avg}-Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21-\%O_2)$

TIME	LOCATION	NO_x			CO			CO_2			O_2			SO_2		
		D_{avg}	G_A	G_A@0%	D_{avg}	G_A	G_A@0%	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	G_A@0%
0300	2-7-3	32.0	26.8	33.2	16.5	49	60	67.8	15.64	19.39	45.5	4.07		81.5	778	965
0400	2-7-4	30.3	25.1	31.1	18.0	56	69	68.0	15.69	19.46	45.5	4.07		83.0	794	984
0500	2-7-5	30.6	25.4	31.6	18.0	56	70	67.8	15.64	19.43	45.8	4.10		85.5	819	1018
0600	2-7-6	31.2	26.0	32.1	18.5	58	72	68.0	15.69	19.40	45.0	4.02		87.0	834	1032
0700	2-7-7	30.8	25.6	31.6	17.5	54	66	68.3	15.76	19.49	45.0	4.02		90.0	865	1069

GAS CONCENTRATION CALCULATION

Date 2-7-85 Operator D. C.

Test No. ______

Avg Gas Response, Davg

Actual Gas Concentration, Ga = $(D_{avg}-Z_{avg}) \times G_s/(S_{avg}-Z_{avg})$

Gas Concentration @ 0%, Ga@0% = $(G_A \times 21)/(21-\%O_2)$

TIME	LOCATION	NO_x			CO			CO_2			O_2			SO_2		
		D_{avg}	G_A	G_A@0%	D_{avg}	G_A	G_A@0%	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	G_A@0%
1100 1200	2-7-8	30.5 29.8	254 247	313 302	16 18.0	58 68	72 84	67.5 68.5	15.81 16.06	19.51 19.64	45 43.5	3.98 3.83		83 75.0	799 717	986 877
1300 1400	2-7-9	31 31.0	259 259	323 320	10.5 10.0	30 28	37 34	— 67.0	— 15.68	— 19.35	46 45.0	4.18 3.98		72 75.0	687 717	857 885
1600	2-7-10	31.8	265	326	14.0	40	50	67.0	15.12	18.62	44.2	3.95		90.0	866	1067
1700	2-7-11	32.0	267	327	13.5	38	46	68.4	15.47	18.97	43.5	3.88		99.0	958	1175
1800	2-7-12	32.0	267	327	13.5	38	46	69.5	15.73	19.30	43.5	3.88		99.0	958	1175
1900	2-7-13	32.8	275	336	14.5	43	52	70.0	15.86	19.37	42.8	3.81		98.5	953	1164
2000	2-7-14	32.8	275	337	14.5	43	52	69.5	15.73	19.30	43.5	3.88		95.0	917	1125
2100	2-7-15	32.2	269	330	14.5	43	52	69.5	15.73	19.30	43.5	3.88		95.0	917	1125
2200	2-7-16	30.4	251	313	14.0	40	50	68.2	15.42	19.25	46.5	4.18		NO INK	—	—
* 2300	2-7-17	23.0	177	285	11.8	29	47	58.0	12.92	20.78	84.0	7.94		NO INK	—	—

* PLANT GOING DOWN

GAS CONCENTRATION CALCULATION

Date 2-10-85 Operator ______

Test No. ______

Avg Gas Response, D_{avg}

Actual Gas Concentration, $G_a = (D_{avg} - Z_{avg}) \times G_s / (S_{avg} - Z_{avg})$

Gas Concentration @ 0%, $G_a@0\% = (G_A \times 21)/(21 - \%O_2)$

TIME	Econ outlet LOCATION	NO blue			CO orange			CO_2 brown			O_2 black			SO_2 violet		
		D_{avg}	G_A	$G_A@0\%$	D_{avg}	G_A	$G_A@0\%$	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	$G_A@0\%$
11:00	2-10-11	31.5	263	326	11.0	35	43	67.8	15.65	19.24	44.5	3.91		71.5	675	830
12 00	2-10-12	32	270	333	10.3	31	39	67.0	15.45	19.05	45.0	3.96		68.5	645	795
13 00	2-10-13	32.5	275	339	10.3	31	39	67.8	15.65	19.27	44.8	3.94		67.8	638	785
14 00	2-10-14	34.0	290	358	9.8	29	36	67.8	15.65	19.29	45.0	3.96		67.0	630	776
15 00	2-10-15	32.5	275	343	9.0	25	31	67.2	15.50	19.31	46.8	4.14		67.0	630	784
16 00	2-10-16	33.0	280	346	8.5	22	28	68.5	15.83	19.57	45.5	4.01		67.2	632	781
17 00	2-10-17	32.5	275	339	7.2	16	20	69.0	15.95	19.64	44.8	3.94		67.8	638	785
18 00	2-10-18	31.5	265	327	8.0	20	25	69.0	15.95	19.69	45.2	3.98		66.8	628	774
19 00	2-10-19	33.8	288	352	9.0	25	30	69.5	16.08	19.65	43.5	3.81		65.0	609	744
20 00	2-10-20	33.5	285	354	6.8	14	17	69.0	15.95	19.78	46.0	4.06		64.5	604	749
21 00	2-10-21	32.8	278	343	7.0	15	18	68.8	15.90	19.60	45.0	3.96		64.5	604	745
22 00	2-10-22	34.5	295	368	7.0	15	19	68.3	15.78	19.68	47.0	4.16		62.5	584	728
23 00	2-10-23	33.5	285	357	6.8	14	17	68.0	15.70	19.64	47.5	4.21		62.0	579	724
24 00	2-10-24	32.5	275	342	6.9	14	18	68.5	15.83	19.65	46.2	4.08		60.5	564	699

GAS CONCENTRATION CALCULATION

Date 2-11-85 Operator ______________

Test No. ______________

Avg Gas Response, D_{avg}

Actual Gas Concentration, $Ga = (D_{avg} - Z_{avg}) \times G_s / (S_{avg} - Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21 - \%O_2)$

TIME	Econo Out LOCATION	NO_x			CO			CO_2			O_2			SO_2		
		D_{avg}	G_A	G_A@0%	D_{avg}	G_A	G_A@0%	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	G_A@0%
1:00	2-11-1	33	280	348	7.5	17	22	68.0	15.70	19.53	46.5	4.11		58.5	543	675
2:00	2-11-2	32.8	278	346	7.5	17	22	67.5	15.58	19.37	46.5	4.11		55.8	516	641
3:00	2-11-3	34.1	291	362	7.8	19	24	67.8	15.65	19.46	46.5	4.11		53.0	487	606
4:00	2-11-4	32.9	279	348	8.0	20	25	67.8	15.65	19.52	47.0	4.16		51.3	470	586
5:00	2-11-5	34.5	295	366	8.2	21	26	68.0	15.70	19.49	46.2	4.08		48.5	442	548
6:00	2-11-6	33.0	280	349	8.6	23	29	68.0	15.70	19.56	46.8	4.14		47.8	435	541
7:00	2-11-7	33.5	285	357	9.2	26	32	67.8	15.65	19.61	47.8	4.24		48.5	442	553

STRATIFICATION

GAS CONCENTRATION CALCULATION

Date 2-11-85 Operator D.C.

Test No. ______

Avg Gas Response, D_{avg}

Actual Gas Concentration, $Ga = (D_{avg}-Z_{avg}) \times G_s/(S_{avg}-Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21-\%O_2)$

TIME	LOCATION	NO_x			CO			CO_2			O_2			SO_2		
		D_{avg}	G_A	G_A@0%	D_{avg}	G_A	G_A@0%	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	G_A@0%
2-11-14 1500	ECON. OUT ALL PROBES	31.5	265	329	14.0	41	51	68.0	15.76	19.53	45.5	4.05		51.2	471	583
1512	PROBE 1	—			17.0	56	69	67.5	15.64	19.32	45.0	4.00		54.0	499	617
1518	PROBE 2	32.6	276	327	15.0	46	54	71.0	16.51	19.53	37.5	3.25		—		
1522	PROBE 3	31.5	265	363	11.5	29	39	61.0	14.01	19.17	61.5	5.65		48.5	443	606
1525	PROBE 4	32.8	278	338	13.0	36	44	69.0	16.01	19.44	42.0	3.70		54.8	507	616
1530	PROBE 5	32.5	275	356	15.0	46	59	65.0	15.01	19.40	52.5	4.75		—		
O2 ONLY 1534	PROBE 6	—	—	—	—	—	—	~~67.5~~	—	—	51.5	4.65		—		
1536	PROBE 7	34.2	292	355	19.5	68	83	67.5	15.64	18.98	42.0	3.70		—		
NO PROBE 8		—			—			—			—			—		
2-11-15 1614	ALL PROBES	33.5	285	356	13.5	39	48	66.0	15.26	19.05	46.8	4.18		52.8	487	608

GAS CONCENTRATION CALCULATION

Date 2-11-85 Operator D.C.

Test No. ____________

Avg Gas Response, Davg

Actual Gas Concentration, $Ga = (D_{avg} - Z_{avg}) \times G_s/(S_{avg} - Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21 - \%O_2)$

TIME	LOCATION	NO_x			CO			CO2			O2			SO2		
		D_{avg}	G_A	G_A@0%	D_{avg}	G_A	G_A@0%	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	G_A@0%
0900	ECON. OUT 2-11-8	34.0	290	361	11.4	28	35	67.5	15.64	19.46	46.3	4.13		57.5	535	666
1000 ~~0900~~	2-11-9	32.8	278	345	12.2	32	40	67.8	15.71	19.50	45.8	4.08		59.0	550	683
1100 ~~0900~~	2-11-10	33.3	283	350	12.4	33	41	68.0	15.76	19.47	45.0	4.00		58.5	545	673
1200 ~~1000~~	2-11-11	34.2	292	366	12.5	34	42	67.0	15.51	19.46	47.6	4.26		53.0	489	613
1300 ~~1100~~	2-11-12	31.8	268	334	12.6	34	42	67.5	15.64	19.49	46.5	4.15		52.5	484	603
1400 ~~1200~~	2-11-13	31.8	268	334	13.5	39	48	67.5	15.64	19.49	46.5	4.15		52.5	484	603
1500 ~~1300~~	2-11-14	31.5	265	329	14.0	41	51	68.0	15.76	19.53	45.5	4.05		51.2	471	583
1614 ~~1600~~	2-11-15	33.5	285	356	13.5	39	48	66.0	15.26	19.05	46.8	4.18		52.8	487	608
1700 1800	2-11-16	32 33.0	269 279	332 348	15.0 15.0	50 50	62 62	67.5 67.5	15.38 15.58	19.23 19.43	45.0 46.8	3.99 4.16		50.0 46.0	454 414	561 516
1900	2-11-17	32.0	269	336	13.5	43	53	67.5	15.58	19.43	46.8	4.16		46.0	414	516
2000	2-11-18	31.6	265	330	12.5	38	47	67.8	15.65	19.49	46.5	4.13		46.5	419	521
2100	2-11-19	33.5	284	354	11.5	33	41	68.0	15.70	19.55	46.5	4.13		45.0	404	503
2200	2-11-20	33.5	284	357	11.0	30	38	67.5	15.58	19.54	47.8	4.26		43.5	389	487

GAS CONCENTRATION CALCULATION

Date 2-11-85 Operator D. C

Test No. ______

Avg Gas Response, D_{avg}

Actual Gas Concentration, $Ga = (D_{avg}-Z_{avg}) \times G_s/(S_{avg}-Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21-\%O_2)$

TIME	LOCATION	NO_x			CO			CO_2			O_2			SO_2		
		D_{avg}	G_A	G_A@0%	D_{avg}	G_A	G_A@0%	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	G_A@0%
2300	ECON. OUT 2-11-21	32.5	274	342	11.5	33	41	67.8	15.65	19.49	46.5	4.13		42.8	381	475
2400	2-11-22	33.5	284	355	11.0	30	37	67.8	15.65	19.52	46.8	4.16		41.8	371	463
0100	2-12-1	32.3	272	340	11.5	33	41	67.5	15.58	19.43	46.8	4.16		41.5	368	459
0200	2-12-2	31.5	264	330	12.0	35	44	67.5	15.58	19.43	46.8	4.16		41.0	363	453
0300	2-12-3	32.2	271	339	14.0	45	56	67.5	15.58	19.45	47.0	4.18		40.8	361	451
0400	2-12-4	32.0	269	336	12.0	35	44	67.8	15.65	19.52	46.8	4.16		40.8	361	451
0500	2-12-5	34.0	289	361	11.3	32	39	67.5	15.58	19.43	46.8	4.16		40.5	358	447
0600	2-12-6	31.5	264	329	12.3	37	46	67.8	15.65	19.49	46.5	4.13		41.5	368	459
0700	2-12-7	32.5	274	342	11.8	34	42	68.0	15.70	19.55	46.5	4.13		41.5	368	459

GAS CONCENTRATION CALCULATION

Date 2-12-85
Test No. 2-13-85
Operator __________

Avg Gas Response, D_{avg}
Actual Gas Concentration, $Ga = (D_{avg}-Z_{avg}) \times G_s/(S_{avg}-Z_{avg})$
Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21-\%O_2)$

TIME	LOCATION	NOx			CO			CO2			O2			SO2		
		D_{avg}	G_A	G_A@0%	D_{avg}	G_A	G_A@0%	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	G_A@0%
21:00	2-12-21	unit off line						—								
22:00	2-12-22	unit off line						—								
23:00	2-12-23	increasing load						—								
24:00	2-12-24	27.8	228	278	26	101	123	—	knocked off line when	unit went down	43.5	3.82		60.5	561	686
1:06	2-13-1	28.0	230	281	28	111	136	—			44.0	3.87		59.2	548	671
2:00	2-13-2	29.0	240	295	25	96	118	—			44.5	3.92		58.2	538	661
3:00	2-13-3	28.5	235	289	24	91	112	—			45.0	3.97		58.5	541	667
4:00	2-13-4	30.6	255	317	19.5	68	85	—			45.8	4.05		61.0	566	701
5:00	2-13-5	29.9	249	307	18.0	61	75	—			45.5	4.02		61.8	574	710
6:00	2-13-6	31.2	261	323	19.0	66	82	—			45.5	4.02		62.5	581	719
7:00	2-13-7	30.0	250	308	16.0	51	63	—			45.3	4.00		65.8	614	759

GAS CONCENTRATION CALCULATION

Date 2-12-85
Test No. Wyodak
Operator ______

Avg Gas Response, D_{avg}
Actual Gas Concentration, $Ga = (D_{avg} - Z_{avg}) \times G_s / (S_{avg} - Z_{avg})$
Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21 - \%O_2)$

TIME	Econo Out LOCATION	NO_x			CO			CO_2			O_2			SO_2		
		D_{avg}	G_A	G_A@0%	D_{avg}	G_A	G_A@0%	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	G_A@0%
8:20	2-12-8	33.8	288	357	14	46	57	66.5	15.22	18.89	46.0	4.08		42.5	376	467
9:00	2-12-9	32.0	270	333	12	36 ~~[illegible]~~	44 720	66.8	15.30	18.87	45.0	3.98		43.0	381	470
10 00	2-12-10	33.3	283	348	16	56	69	67.5	15.47	19.03	44.5	3.93		43.1	382	470
11 00	2-12-11	34.0	290	356	17	61	75	68.2	15.64	19.19	44.0	3.88		48.8	439	539
12 00	2-12-12	32.2	272	331	16	56	68	68.0	15.60	18.99	42.8	3.76		55.0	502	611
13 00	2-12-13	31.8	268	325	25	101	122	68.5	15.72	19.06	42.0	3.68		65.0	602	730
14 00	2-12-14	32.0	270	327	27	111	134	68.5	15.72	19.06	42.0	3.68		69.5	648	785
15 00	2-12-15	32.0	270	329	18	66	80	69.0	15.84	19.32	43.0	3.78		70.5	658	802
16 26	2-12-16	31.8	267	326	19	66	81	68.5	15.83	19.38	43.8	3.85		75.5	712	872
17 00	2-12-17	31.5	264	323	19	66	81	68.5	15.83	19.35	43.5	3.82		73.5	692	846
18 00	2-12-18	unit off line														
19 00	2-12-19	unit off line														
20 00	2-12-20	unit off line														

GAS CONCENTRATION CALCULATION

Date 2-13-85

Test No. ____

Operator ____

Avg Gas Response, D_{avg}

Actual Gas Concentration, $Ga = (D_{avg}-Z_{avg}) \times G_s/(S_{avg}-Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21-\%O_2)$

MWe	TIME	Econo Out LOCATION	NO_x			CO			CO_2			O_2			SO_2		
			D_{avg}	G_A	G_A@0%	D_{avg}	G_A	G_A@0%	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	G_A@0%
319.5 244.3	9:00	2-13-9	28	230	295	13.5	42	54	65	15.09	19.33	51.5	4.61		65.0	607	778
273 275	10:00	2-13-10	25.2	202	258	11.3	31	40	63.3	14.66	18.76	51.3	4.59		65.5	612	784
275 272	11:00	2-13-11	25.2	202	260	10.8	29	37	64.5	14.97	19.23	52.0	4.66		64.7	604	774
270 273	12:44	2-13-12	24.8	198	256	10.5	27	35	64.0	14.84	19.19	53.0	4.76		64.0	597	772
274.8 275.5	1300	2-13-13	25.0	200	256	11.3	30	38	66.2	14.94 [illegible]	19.06 [illegible]	50.4	4.54		64.5	599	765
310 327	14:00	2-13-14	26.5	216	269	13.5	41	51	68.0	15.38	19.22	47.0	4.20		63.5	589	737
366 367	15 00	2-13-15	30.8	259	319	19.0	68	85	69.4	15.72	19.42	45.0	4.00		64.5	599	740
	16 00	2-13-16	30.5	256	316	16	54	66	69.5	15.74	19.45	45.0	4.00		65.5	609	753
	17 00	2-13-17	31.4	256	327	14.0	44	54	69.5	15.74	19.45	45.0	4.00		64.7	601	743
	18 00	2-13-18	31.4	265	327	14.3	45	56	69.5	15.74	19.45	45.0	4.00		66.5	620	765
	19 00	2-13-19	31.5	266	326	17.0	58	72	69.9	15.84	19.46	44.0	3.90		65.0	604	742
	20 00	2-13-20	31.3	264	325	16.5	56	69	69.7	15.79	19.45	44.5	3.95		67.5	630	775
	21 00	2-13-21	31.3	264	325	18.0	63	78	69.9	15.84	19.51	44.5	3.95		66.8	623	767

cal

GAS CONCENTRATION CALCULATION

Date 2-13-85
Test No. 2-14-85

Operator ______________

Avg Gas Response, D_{avg}

Actual Gas Concentration, $Ga = (D_{avg} - Z_{avg}) \times G_s / (S_{avg} - Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21 - \%O_2)$

TIME	LOCATION	NO$_x$			CO			CO$_2$			O$_2$			SO$_2$		
		D_{avg}	G_A	G_A@0%	D_{avg}	G_A	G_A@0%	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	G_A@0%
22 00	2-13-22	32.8	279	343	15.2	50	61	69.8	15.82	19.84	44.5	3.95		66.5	620	763
23 00	2-13-23	33.8	289	358	13	39	48	69.5	15.74	19.51	45.5	4.05		68.0	635	786
24 00	2-13-24	32.8	279	345	13.5	41	51	69.2	15.67	19.42	45.5	4.05		69.0	645	799
1:00	2-14-1	31.2	263	326	13.5	41	51	69.0	15.62	19.41	46.0	4.10		68.0	635	789
2 00	2-14-2	32.3	274	340	15.2	50	61	69.8	15.82	19.63	45.8	4.08		65.2	606	753
3 00	2-14-3	31.2	263	325	14	44	54	69.2	15.67	19.38	45.2	4.02		66.5	620	766
4 00	2-14-4	32.5	276	344	15	49	61	69.0	15.62	19.50	46.8	4.18		67.5	630	786
5 00	2-14-5	31.8	269	335	19	68	85	69.3	15.69	19.60	46.8	4.18		69.0	645	805
320NW 6 00	2-14-6	30.0	251	316	13.5	41	52	68.2	15.42	19.46	48.5	4.35		68.0	635	800
320NW 7 00	2-14-7	29.0	241	303	14	44	55	68.5	15.50	19.55	48.5	4.35		68.2	637	803

INSTRUMENT CALIBRATION

DATE 1-31-95

TEST NO.

TIME OF INITAL CALIBRATION 1440

TIME OF FINAL CALIBRATION 1713

Plant WYODAK

Operator D.C.

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	4.0	5.3	4.5	5.0
Initial Span Response, S_i (Div)	86.25	85.0	99.0	85.0	87.0
Final Span Response, S_f (Div)	82.0	84.4	99.4	85.5	86.8
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	6.0	4.5	5.15	4.75	5.0
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	84.13	84.7	99.2	85.25	86.9
Zero Drift, (%) $= (Z_f - Z_i)$	0	-1	0.3	-0.5	0
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	-4.25	0.4	0.1	1.0	-0.2

INSTRUMENT CALIBRATION

DATE 1-31-85
TEST NO.
TIME OF INITAL CALIBRATION 1723
TIME OF FINAL CALIBRATION 0741

Plant WYODAK
Operator D.C.

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	50	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.2	6.5	5.3	4.9	5.2
Initial Span Response, S_i (Div)	86.3	85.1	99.0	85.0	87.0
Final Span Response, S_f (Div)	84.9	86.5	98.0	85.0	85.0
Avg. Zero Response, Z_{avg} (Div) = $(Z_i + Z_f)/2$	5.1	5.75	5.15	4.95	5.1
Avg. Span Response, S_{avg} (Div) = $(S_i + S_f)/2$	85.6	85.8	98.5	85	86.0
Zero Drift, (%) = $(Z_f - Z_i)$	0.2	1.5	0.3	-0.1	+.2
Span Drift, (%) = $(S_f - Z_f) - (S_i - Z_i)$	-1.6	-0.1	-1.3	0.10	-2.2

INSTRUMENT CALIBRATION

DATE 2-1-85
TEST NO.
TIME OF INITAL CALIBRATION 0750
TIME OF FINAL CALIBRATION 1054

Plant WYODAK
Operator D.C.

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	870
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	5.0	5.0	5.1	4.9
Initial Span Response, S_i (Div)	86.3	84.2	98.9	85.0	87.0
Final Span Response, S_f (Div)	87.8	84.0	99.6	85.0	85.0
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5	5	5	5.05	4.95
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	87.05	84.1	99.25	85.0	86.0
Zero Drift, (%) $= (Z_f - Z_i)$	0	0	0	0.1	-0.1
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	1.5	-.2	0.7	-0.1	-1.9

INSTRUMENT CALIBRATION

DATE 2-1-85

TEST NO. ________

TIME OF INITAL CALIBRATION 1054

TIME OF FINAL CALIBRATION 1642

Plant WYODAK

Operator D.C.

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.1	4.9
Final Zero Response, Z_f (Div)	4.9	3.5	5.0	5.3	5.3
Initial Span Response, S_i (Div)	87.8	84.0	99.6	85.0	85.0
Final Span Response, S_f (Div)	87.7	81.6	98.5	85.3	86.0
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	4.95	4.25	5.0	5.2	5.1
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	87.75	82.80	99.05	85.15	85.5
Zero Drift, (%) $= (Z_f - Z_i)$	-0.1	-1.5	0	0.20	+.4
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	0	-.9	-1.1	0.1	+.6

INSTRUMENT CALIBRATION

DATE 2-1-85
TEST NO.
TIME OF INITAL CALIBRATION 1652
TIME OF FINAL CALIBRATION 1016 2/2/85

Plant WYODAK
Operator D.C.

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.2	5.0	5.0	5.2
Final Zero Response, Z_f (Div)	5.0	5.5	5.0	5.4	5.0
Initial Span Response, S_i (Div)	86.4	85.0	99.0	85.0	87.0
Final Span Response, S_f (Div)	86.6	85.0	99.0	85.8	87.0
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.0	5.35	5.0	5.2	5.1
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	86.5	85.0	99.0	85.4	87.0
Zero Drift, (%) $= (Z_f - Z_i)$	0	0.3	0	0.4	-0.2
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	.2	-.3	0	0.4	+0.2

INSTRUMENT CALIBRATION

DATE 2-2-85

TEST NO.

TIME OF INITAL CALIBRATION 1016

TIME OF FINAL CALIBRATION 1522

Plant WYODAK

Operator D.C.

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.2	4.0	5.0	4.8	5.5
Initial Span Response, S_i (Div)	86.1	85.3	99.0	85.0	87.0
Final Span Response, S_f (Div)	86.6	83.0	99.1	85.3	86.0
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.10	4.50	5.0	4.9	5.25
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	86.35	84.15	99.05	85.15	86.5
Zero Drift, (%) $= (Z_f - Z_i)$	0.2	-1.0	0	-0.2	+0.5
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	0.3	-1.3	0.1	0.50	-1.5

INSTRUMENT CALIBRATION

DATE 2-2-85

TEST NO. ____

TIME OF INITAL CALIBRATION 1530

TIME OF FINAL CALIBRATION 0820

Plant WYODAK

Operator D.C.

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	6.6	5.2	4.8	4.7
Initial Span Response, S_i (Div)	86.3	84.6	99.1	85.0	87.0
Final Span Response, S_f (Div)	84.0	87.0	103.0	85.3	85.0
Avg. Zero Response, Z_{avg} (Div) = $(Z_i + Z_f)/2$	5.0	5.8	5.1	4.9	4.85
Avg. Span Response, S_{avg} (Div) = $(S_i + S_f)/2$	85.15	85.40	101.05	85.15	86.0
Zero Drift, (%) = (Z_f-Z_i)	0	1.6	.2	-.2	-0.3
Span Drift, (%) = $(S_f-Z_f)-(S_i-Z_i)$	-23	.8	3.7	0.5	-1.7

INSTRUMENT CALIBRATION

DATE 2-3-85

TEST NO.

TIME OF INITAL CALIBRATION 1006

TIME OF FINAL CALIBRATION 0740

Plant WYODAK

Operator D.C.

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.3	4.5	5.0	4.0	5.2
Initial Span Response, S_i (Div)	86.2	84.7	99.0	85.0	87.2
Final Span Response, S_f (Div)	85.6	84.5	98.5	85.3	84.6
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.15	4.75	5.0	4.5	5.1
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	85.9	84.6	98.75	85.15	85.9
Zero Drift, (%) $= (Z_f-Z_i)$	0.3	-0.5	0.0	-1.0	0.2
Span Drift, (%) $= (S_f-Z_f)-(S_i-Z_i)$	-0.9	0.3	-0.5	1.3	-2.8

INSTRUMENT CALIBRATION

DATE 2-4-85
TEST NO.
TIME OF INITAL CALIBRATION 0808
TIME OF FINAL CALIBRATION 1458

Plant WYODAK
Operator D.C.

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.4	4.5	5.4	5.0	5.2
Initial Span Response, S_i (Div)	86.3	85.0	99.1	85.0	87.2
Final Span Response, S_f (Div)	89.0	84.0	99.3	85.3	84.8
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.2	4.75 ~~5.0~~	5.2	5.0	5.1
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	87.65 ~~5.4~~	84.50 ~~4.5~~	99.20 ~~5.4~~	85.15 ~~5.0~~	86.0
Zero Drift, (%) = $(Z_f - Z_i)$	0.4	-0.5	0.4	0	0.2
Span Drift, (%) = $(S_f - Z_f) - (S_i - Z_i)$	2.3	-0.5	-0.2	0.3	-2.6

INSTRUMENT CALIBRATION

DATE 2-4-85
TEST NO.
TIME OF INITAL CALIBRATION 1534
TIME OF FINAL CALIBRATION 1650

Plant WYODAK
Operator D.C.

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	4.9	5.0	5.4	5.0
Initial Span Response, S_i (Div)	86.3	85.0	99.0	85.0	87.0
Final Span Response, S_f (Div)	86.7	85.0	99.0	85.4	85.0
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.0	4.95	5.0	5.2	5.0
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	86.5	85.00	99.00	85.2	86.0
Zero Drift, (%) $= (Z_f - Z_i)$	0	-0.1	0.0	0.4	0.0
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	0.4	0.1	0.0	0.0	-2.0

INSTRUMENT CALIBRATION

DATE 2-4-85
TEST NO.
TIME OF INITAL CALIBRATION 1650
TIME OF FINAL CALIBRATION 0747

Plant WYODAK
Operator D.C.

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	4.9	5.0	5.4	5.0
Final Zero Response, Z_f (Div)	5.0	5.0	5.0	5.4	5.0
Initial Span Response, S_i (Div)	86.7	85.0	99.0	85.4	85.0
Final Span Response, S_f (Div)	86.7	84.5	98.9	85.0	83.8
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.0	4.95	5.00	5.40	5.0
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	86.7	84.75	98.95	85.2	84.4
Zero Drift, (%) = $(Z_f - Z_i)$	0	.1	0	0	0.0
Span Drift, (%) = $(S_f - Z_f) - (S_i - Z_i)$	0	-.6	-.1	-0.4	-1.2

INSTRUMENT CALIBRATION

DATE 2-5-85

TEST NO. ______

TIME OF INITAL CALIBRATION 0821

TIME OF FINAL CALIBRATION 1643

Plant WYODAK

Operator D.C.

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	3.8	5.0	4.9	5.0
Initial Span Response, S_i (Div)	86.2	84.0	99.0	85.0	87.0
Final Span Response, S_f (Div)	86.8	83.5	99.6	85.3	86.0
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.0	4.4	5.0	4.95	5.0
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	86.5	83.75	99.3	85.15	86.5
Zero Drift, (%) $= (Z_f - Z_i)$	0.0	-1.2	0.0	-0.1	0.0
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	0.6	0.7	0.6	0.4	-1.0

INSTRUMENT CALIBRATION

DATE 2-5-85
TEST NO.
TIME OF INITAL CALIBRATION 1655
TIME OF FINAL CALIBRATION 0742

Plant WYODAK
Operator D.C.

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	5.8	5.0	4.8	5.0
Initial Span Response, S_i (Div)	86.3	85.0	99.0	85.0	87.0
Final Span Response, S_f (Div)	86.0	87.0	103.0	86.0	86.8
Avg. Zero Response, Z_{avg} (Div) = $(Z_i + Z_f)/2$	5.0	5.4	5.0	4.9	5.0
Avg. Span Response, S_{avg} (Div) = $(S_i + S_f)/2$	86.15	86.0	101.0	85.0	86.9
Zero Drift, (%) = $(Z_f - Z_i)$	0.0	0.8	0.0	-0.2	0.0
Span Drift, (%) = $(S_f - Z_f) - (S_i - Z_i)$	-0.3	1.2	4.0	1.2	-0.2

INSTRUMENT CALIBRATION

DATE 2-6-85
TEST NO.
TIME OF INITAL CALIBRATION 0900
TIME OF FINAL CALIBRATION 1645

Plant WYODAK
Operator D.C.

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.3	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.3	3.8	5.7	5.2	5.3
Initial Span Response, S_i (Div)	86.1	85.4	99.0	85.0	87.0
Final Span Response, S_f (Div)	86.5	82.5	105.0	85.7	85.0
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.15	4.55	5.35	5.10	5.15
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	86.3	83.95	102.0	85.35	86.0
Zero Drift, (%) $= (Z_f - Z_i)$	0.3	-1.5	0.7	0.2	0.3
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	0.1	-1.4	5.3	0.5	-2.3

INSTRUMENT CALIBRATION

DATE 2-6-85
TEST NO.
TIME OF INITAL CALIBRATION 1658
TIME OF FINAL CALIBRATION 0750

Plant WYODAK
Operator D.C.

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.3	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	8.5	5.1	5.0	5.0
Initial Span Response, S_i (Div)	86.2	85.0	99.0	85.0	87.0
Final Span Response, S_f (Div)	87.6	90.0	99.0	84.3	84.2
Avg. Zero Response, Z_{avg} (Div) = $(Z_i + Z_f)/2$	5.0	6.75	5.2	5.0	5.0
Avg. Span Response, S_{avg} (Div) = $(S_i + S_f)/2$	86.9	87.5	99.0	84.65	85.6
Zero Drift, (%) = (Z_f-Z_i)	0.0	3.5	-0.2	0.0	0.0
Span Drift, (%) = $(S_f-Z_f)-(S_i-Z_i)$	1.4	1.5	0.2	-0.7	-2.8

INSTRUMENT CALIBRATION

DATE 2-7-85
TEST NO.
TIME OF INITAL CALIBRATION 1000
TIME OF FINAL CALIBRATION 1458

Plant WYODAK
Operator D. C.

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.2	4.0	5.0	5.4	5.2
Initial Span Response, S_i (Div)	86.4	84.9	99.0	85.0	87.0
Final Span Response, S_f (Div)	86.3	83.0	96.3	85.3	83.0
Avg. Zero Response, Z_{avg} (Div) = $(Z_i + Z_f)/2$	5.1	4.5	5.0	5.2	5.1
Avg. Span Response, S_{avg} (Div) = $(S_i + S_f)/2$	86.35	83.95	97.65	85.15	85.0
Zero Drift, (%) = (Z_f-Z_i)	0.2	-1.0	0.0	0.4	0.2
Span Drift, (%) = $(S_f-Z_f)-(S_i-Z_i)$	-0.3	-0.9	-2.7	-0.1	-4.2

INSTRUMENT CALIBRATION

DATE 2-7-85
TEST NO. ____
TIME OF INITAL CALIBRATION 1503
TIME OF FINAL CALIBRATION 0740

Plant WYODAK
Operator D.C.

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.2	5.0	5.0	5.0	5.2
Final Zero Response, Z_f (Div)	5.3	7.0	5.2	4.7	5.2
Initial Span Response, S_i (Div)	86.3	85.2	99.0	85.0	87.0
Final Span Response, S_f (Div)	87.1	86.5	103.0	84.2	84.0
Avg. Zero Response, Z_{avg} (Div) = $(Z_i + Z_f)/2$	5.25	6.0	5.1	4.85	5.2
Avg. Span Response, S_{avg} (Div) = $(S_i + S_f)/2$	86.7	85.85	101.0	84.6	85.5
Zero Drift, (%) = (Z_f-Z_i)	0.1	2.0	0.2	-0.3	0.0
Span Drift, (%) = $(S_f-Z_f)-(S_i-Z_i)$	0.7	-0.7	3.8	-0.5	-3.0

INSTRUMENT CALIBRATION

DATE 2-10-85

TEST NO. ______

TIME OF INITAL CALIBRATION 0915

TIME OF FINAL CALIBRATION 0740

Plant WYODAK

Operator D.C

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	3.0	5.0	5.0	5.0
Initial Span Response, S_i (Div)	86.4	85.6	99.0	85.0	87.0
Final Span Response, S_f (Div)	86.0	84.0	99.0	86.5	84.5
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.0	4.0	5.0	5.0	5.0
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	86.2	84.8	99.0	85.75	85.75
Zero Drift, (%) $= (Z_f - Z_i)$	0	-2	0	0	0.0
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	-0.4	0.4	0	1.5	-2.5

INSTRUMENT CALIBRATION

DATE 2-11-85

TEST NO.

TIME OF INITAL CALIBRATION 0755

TIME OF FINAL CALIBRATION 1637

Plant WYODAK

Operator D.C.

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	4.8	6.5	4.8	5.0	5.0
Initial Span Response, S_i (Div)	86.5	85.2	99.0	85.0	87.0
Final Span Response, S_f (Div)	86.3	88.0	98.4	85.0	84.0
Avg. Zero Response, Z_{avg} (Div) = $(Z_i + Z_f)/2$	4.9	5.75	4.9	5.0	5.0
Avg. Span Response, S_{avg} (Div) = $(S_i + S_f)/2$	86.4	86.6	98.7	85.0	85.5
Zero Drift, (%) = $(Z_f - Z_i)$	-0.2	1.5	-0.2	0.0	0.0
Span Drift, (%) = $(S_f - Z_f) - (S_i - Z_i)$	0.0	1.3	-0.4	0.0	-3.0

INSTRUMENT CALIBRATION

DATE 2-11-85

TEST NO.

TIME OF INITAL CALIBRATION 1650

TIME OF FINAL CALIBRATION 0744

Plant WYODAK

Operator D.C.

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	5.0	5.0	5.4	5.0
Initial Span Response, S_i (Div)	86.3	85.5	99.0	85.0	87.0
Final Span Response, S_f (Div)	86.5	85.0	99.0	85.4	85.5
Avg. Zero Response, Z_{avg} (Div) = $(Z_i + Z_f)/2$	5.0	5.0	5.0	5.2	5.0
Avg. Span Response, S_{avg} (Div) = $(S_i + S_f)/2$	86.4	85.25	99.0	85.2	86.25
Zero Drift, (%) = $(Z_f - Z_i)$	0.0	0.0	0.0	0.4	0.0
Span Drift, (%) = $(S_f - Z_f) - (S_i - Z_i)$	0.2	-0.5	0.0	0.0	-1.5

INSTRUMENT CALIBRATION

DATE 2-~~11~~12-85
TEST NO.
TIME OF INITAL CALIBRATION 0757
TIME OF FINAL CALIBRATION 1552

Plant WYODAK
Operator D.C.

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	4.5	5.0	5.3	5.2
Initial Span Response, S_i (Div)	86.3	85.0	99.0	85.0	87.0
Final Span Response, S_f (Div)	86.2	86.0	100.3	85.6	86.3
Avg. Zero Response, Z_{avg} (Div) = $(Z_i + Z_f)/2$	5.0	4.75	5.00	5.15	5.1
Avg. Span Response, S_{avg} (Div) = $(S_i + S_f)/2$	86.25	85.5	99.65	85.3	86.65
Zero Drift, (%) = $(Z_f - Z_i)$	0	-0.5	0	0.3	0.2
Span Drift, (%) = $(S_f - Z_f) - (S_i - Z_i)$	-0.1	1.5	1.3	0.3	-0.9

INSTRUMENT CALIBRATION

DATE 2-12-85
TEST NO.
TIME OF INITAL CALIBRATION 1600
TIME OF FINAL CALIBRATION 0740 2/13

Plant WYODAK
Operator D. C

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	6.5	PEN STUCK 5.0	5.0	5.0
Initial Span Response, S_i (Div)	86.3	85.0	99.0	85.0	87.0
Final Span Response, S_f (Div)	86.5	88.0	PEN STUCK	86.2	85.3
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.0	5.75	5.0	5.0	5.0
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	86.4	86.5	99.0	85.6	86.15
Zero Drift, (%) = $(Z_f - Z_i)$	0	1.5	0	0	0.0
Span Drift, (%) = $(S_f - Z_f) - (S_i - Z_i)$	0.2	1.50	0.0	1.2	-1.7

INSTRUMENT CALIBRATION

DATE 2-13-85

TEST NO.

TIME OF INITAL CALIBRATION 0805

TIME OF FINAL CALIBRATION 1157

Plant WYODAK

Operator D.C.

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	5.0	5.0	5.7	5.0
Initial Span Response, S_i (Div)	86.3	86.0	99.0	85.0	87.0
Final Span Response, S_f (Div)	86.2	85.8	97.3	86.0	85.0
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.0	5.0	5.0	5.35	5.0
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	86.25	85.9	98.15	85.5	86.0
Zero Drift, (%) $= (Z_f - Z_i)$	0	0	0	0.7	0.0
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	-0.1	-0.2	-1.7	0.3	-2.0

INSTRUMENT CALIBRATION

DATE 2-13-85

TEST NO. ______

TIME OF INITAL CALIBRATION 1207

TIME OF FINAL CALIBRATION 0726

Plant WYODAK

Operator D.C.

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	5.5	5.0	4.9	5.0
Initial Span Response, S_i (Div)	86.3	85.5	99.0	85.0	87.0
Final Span Response, S_f (Div)	85.8	86.5	103.0	85.0	85.8
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.0	5.25	5.0	4.95	5.0
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	86.05	86.0	101.0	85.0	86.4
Zero Drift, (%) $= (Z_f - Z_i)$	0	0.5	0	-0.1	0.0
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	-0.5	0.5	4.0	0.1	-1.2

APPENDIX C

TEST DATA

C-1

COMANCHE
GASEOUS EMISSIONS DATA

Comanche

Instantaneous readings

NO_x vs OFA% open @ constant O_2 -12/12

Test Dates

12/7/84 1345-1615; 209-265 MWe; 3.2-3.4% O_2; OFA-Closed; "2A" MOOS

12/8/84 930-1130; "2A" MOOS; 152-286 MWe; 3.2-3.4% O_2; OFA-Closed
1300-1600; 252-269 MWe; 3.2-3.4% O_2; OFA-Closed; all mills

12/10/84 830- 930; 334-360 MWe; 3.95-4.05% O_2 OFA-Open; all mills on
1000-1330; 296-345 MWe; 2.7-3.95% O_2; OFA-Closed; all mills on
1500-1600; 261-273 MWe; 2.75-2.9% O_2; "2A" MOOS, OFA-Closed
1630 ; 281 MWe; 3.0% O_2; OFA-Open; all mills on

12/11/84 1100-1430; 257-263 MWe; 2.5-2.7% O_2; OFA-Closed; all mills on except 1300

12/12/84 800-1430; 290-321 MW; 2.5-2.75% O_2; OFA-Closed, all mills on

OFA - normally open 18%

Comanche

Overfire Air

12/8/84 9:10 NO_x ports closed ←

12/10/84 9:40 OFA ports closed
16:15 OFA ports opened

12/11/84 16:15 OFA ports opened

12/12/84 OFA Test

750 OFA Closed

%Open	Time	Load
10	1445	270 MW
20	1455	295
30	1505	291
40	1515	285
50	1525	294
60	1535	302
70	1545	315
80	1555	305
90	1610	295
100	1620	293
Normal	1628	305 MW

avg. load = 298 MW ± 8.7

↑

± 2.9%
rel std
dev

w/out 315 MW
avg load = 296 ± 6.7 = 2.2%

HOURLY AVERAGES

COMANCHE POWER PLANT

GAS CONCENTRATION CALCULATION

Date 12-7&8-84 Operator ______

Test No. ______

Avg Gas Response, D_{avg}

Actual Gas Concentration, $G_a = (D_{avg} - Z_{avg}) \times G_s/(S_{avg} - Z_{avg})$

Gas Concentration @ 0%, $G_a@0\% = (G_A \times 21)/(21 - \%O_2)$

HI 20PPM/DIV ↓

TIME	LOCATION	NO_x			CO			CO_2			O_2			SO_2		
		D_{avg}	G_A	G_A@0%	D_{avg}	G_A	G_A@0%	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	G_A@0%
12-7 1215-1315		20.0	152	183	HI 47.0	844	1016	68.5	15.87	19.11	40.5	3.56		39.0	340	409
12-7 1342-1442		30.0	253	300	HI 28.0	462	528	68.8	15.95	18.91	37.8	3.29		40.5	355	421
12-7 1442-1542	—	31.5	269	317	18.0	261	308	69.8	16.2	19.12	37.0	3.21		43.2	382	455
12-7 1730-1830		34.5	299	356	14.0	182	217	69.5	16.33	19.46	38.5	3.37		43.5	385	459
12-7 1830-1930		34.5	299	356	17.0	242	288	69.5	16.33	19.46	38.5	3.37		41.5	365	435
12-7 1930-2030		30.0	257	304	20.0	302	362	69.5	16.33	19.57	39.5	3.47		42.0	370	443
12-7 2030-21-30		30.5	258	310	20.0	302	362	69.0	16.21	19.42	39.5	3.47		42.0	370	443
12-7 2130-2230		30.5	258	311	19.0	282	339	68.5	16.08	19.32	40.0	3.52		40.0	350	420
12-7 2230-2330		31.0	264	316	19.0	282	338	68.5	16.08	19.26	39.5	3.47		38.5	335	401
12-8 2330-0030		28.0	233	278	17.5	252	301	68.5	16.08	19.21	39.0	3.42		38.5	335	400
12-8 0030-0130		29.5	248	296	20.0	302	360	68.5	16.08	19.15	38.5	3.37		36.5	315	375
12-8 0130-0230		28.5	238	284	20.0	302	360	68.2	16.00	19.06	38.5	3.37		37.5	325	387
12-8 0230-0330		30.5	258	308	21.5	332	395	67.8	15.90	18.94	38.5	3.37		38.0	330	393

GAS CONCENTRATION CALCULATION

Date 12-8 & 9-84 Operator __________

Test No. __________

Avg Gas Response, D_{avg}

Actual Gas Concentration, $G_a = (D_{avg} - Z_{avg}) \times G_s/(S_{avg} - Z_{avg})$

Gas Concentration @ 0%, $G_a@0\% = (G_A \times 21)/(21 - \%O_2)$

41 20 ppm/DIV

TIME	LOCATION	NO_x			CO			CO_2			O_2			SO_2		
		D_{avg}	G_A	$G_A@0\%$	D_{avg}	G_A	$G_A@0\%$	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	$G_A@0\%$
12-8 0330-0430		30.2	255	305	18.5	272	325	67.5	15.82	18.91	39.0	3.42		39.5	345	412
12-8 0430-0530		32.5	279	335	26.0	422	507	67.5	15.82	19.01	40.0	3.52		39.0	340	408
12-8 0530-0630		33.0	284	341	25.0	402	483	67.0	15.70	18.86	40.0	3.52		39.0	340	408
12-8 0630-0730	—	29.0	243	291	18.0	262	313	67.5	15.82	18.90	39.0	3.42		37.5	325	388
12-8 0930-1030		33.5	287	342	17.5	251	299	68.5	15.82	18.85	39.0	3.37		38.5	335	399
12-8 1030-1130		37.0	322	384	28.0	462	551	69.5	16.07	19.14	39.0	3.37		37.5	325	387
12-8 1130-1230		41.5	368	433	7.5	50	59	69.5	16.07	18.93	37.0	3.17		38.5	335	395
12-8 1230-1330		41.5	368	433	7.5	50	59	69.8	16.14	19.02	37.0	3.17		38.5	335	395
12-8 1330-1430		42.5	378	445	7.5	50	59	69.5	16.07	18.93	37.0	3.17		38.5	335	395
12-8 1430-1530		42.5	378	446	8.0	60	71	69.0	15.94	18.83	37.5	3.22		36.0	310	366
12-8 1530-1630	—	41.5	368	437	8.0	60	72	68.5	15.82	18.79	38.5	3.32		31.0	260	309
12-9 1355-1455		36.0	314	370	16.0	221	261	69.5	16.27	19.19	37.0	3.20		37.0	320	378
12-9 1455-1600		38.0	334	393	14.0	181	213	69.5	16.27	19.14	36.5	3.15		39.0	340	400

GAS CONCENTRATION CALCULATION

Date 12-9 & 10-84　　Operator ____________

Test No. ____________

Avg Gas Response, Davg

Actual Gas Concentration, Ga = $(D_{avg}-Z_{avg}) \times G_s/(S_{avg}-Z_{avg})$

Gas Concentration @ 0%, Ga@0% = $(G_A \times 21)/(21-\%O_2)$

HI 20ppm/div

TIME	LOCATION	NO$_x$			CO			CO$_2$			O$_2$			SO$_2$		
		D$_{avg}$	G$_A$	G$_A$@0%	D$_{avg}$	G$_A$	G$_A$@0%	D$_{avg}$	GA	Ga@0%	D$_{avg}$	Ga	Ga@0%	D$_{avg}$	G$_A$	G$_A$@0%
12-9 1600-1700		39.5	349	412	17.0	241	284	70.0	16.39	19.34	37.0	3.20		38.0	330	389
12-9 1700-1800		40.0	354	417	17.0	241	284	70.5	16.52	19.43	36.1	3.15		36.5	315	371
12-9 1800-1900		40.0	354	418	18.0	261	308	70.5	16.52	19.49	37.0	3.20		35.5	305	360
12-9 1900-2000		40.5	359	423	18.0	261	308	70.8	16.60	19.56	36.8	3.18		33.5	285	336
→ 12-9 2000-2100		39.5	349	411	19.0	281	331	70.5	16.52	19.43	36.5	3.15		36.0	310	365
12-9 2100-2200		38.0	334	393	16.0	221	260	70.5	16.52	19.43	36.5	3.15		39.0	340	400
12-9 2200-2300		35.5	309	363	17.0	241	284	70.5	16.52	19.43	36.5	3.15		39.0	340	400
12-9 2300-2400		33.5	288	338	16.0	221	259	70.5	16.52	19.38	36.0	3.10		37.0	320	375
12-10 2400-0100		32.5	278	327	18.0	261	307	70.5	16.52	19.43	36.5	3.15		35.0	300	353
12-10 0100-0200		32.5	278	325	19.0	281	329	70.8	16.60	19.41	35.5	3.05		34.0	290	337
12-10 0200-0300		33.0	283	333	18.0	261	307	70.5	16.52	19.43	36.5	3.15		33.0	280	329
12-10 0300-0400		33.0	283	355	20.0	301	378	66.5	15.51	19.45	47.5	4.25		30.0	[illegible]	313
12-10 0400-0500		31.5	268	337	19.0	281	354	66.5	15.51	19.50	48.0	4.30		28.5	235	296

GAS CONCENTRATION CALCULATION

Date 12-10-84 Operator ____________

Test No. ____________

Avg Gas Response, Davg

Actual Gas Concentration, Ga = $(D_{avg}-Z_{avg}) \times G_s/(S_{avg}-Z_{avg})$

Gas Concentration @ 0%, Ga@0% = $(G_A \times 21)/(21-\%O_2)$

1' 20 PPM/DIV

TIME	LOCATION	NO			CO			CO2			O2			SO2		
		D_{avg}	G_A	G_A@0%	D_{avg}	G_A	G_A@0%	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	G_A@0%
12-10 0500-0600		35.0	304	382	19.0	281	354	66.5	15.51	19.50	48.0	4.30		29.5	245	308
12-10 0600-0700	—	36.5	319	401	27.0	442	556	66.0	15.38	19.35	48.0	4.30		30.5	255	321
12-10 0815-0915		46.5	419	518	7.8	56	70	66.5	15.58	19.29	45.5	4.04		38.0	330	409
12-10 0915-1015		50.0	454	557	7.6	52	64	67.0	15.70	19.28	44.0	3.89		39.5	345	423
12-10 1015-1115		48.5	439	537	7.0	40	49	67.5	15.83	19.38	43.5	3.84		40.0	350	428
12-10 1500-1600	—	36.0	313	361	INR OUT	—	—	69.0	16.21	18.69	33.0	2.79		39.0	340	392
12-10 1720-1820		46.0	412	472	8.5	73	84	73.0	16.77	19.23	31.8	2.68		42.5	375	430
12-10 1820-1920		42.5	377	431	8.0	63	72	74.0	17.02	19.48	31.5	2.65		40.5	355	406
12-10 1920-2020		42.0	372	425	8.5	73	84	74.5	17.14	19.62	31.5	2.65		38.0	[illegible]	378
12-10 2020-2120		44.5	397	453	8.5	73	84	74.5	17.14	19.56	31.0	2.60		38.5	335	382
12-10 2120-2220		42.5	377	432	8.5	73	84	74.5	17.14	19.67	32.0	2.70		37.0	320	367
12-10 2220-2320		40.5	357	408	8.5	73	84	74.5	17.14	19.62	31.5	2.65		36.5	315	360
12-10 2320-0020		41.5	367	421	8.5	73	84	74.0	17.02	19.52	32.0	2.70		41.5	365	419

GAS CONCENTRATION CALCULATION

Date 12-11-84 Operator ______________
Test No. ______________

Avg Gas Response, D_{avg}
Actual Gas Concentration, $Ga = (D_{avg}-Z_{avg}) \times G_s/(S_{avg}-Z_{avg})$
Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21-\%O_2)$

Hi 20 PPM/DIV

	TIME	LOCATION	NO$_x$			CO			CO$_2$			O$_2$			SO$_2$		
			D_{avg}	G_A	G_A@0%	D_{avg}	G_A	G_A@0%	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	G_A@0%
12-11	0020-0120		46.0	412	473	8.5	73	84	74.0	17.02	19.53	32.0	2.70		42.5	375	430
12-11	0120-0220		45.0	407	461	8.0	63	73	74.0	17.02	19.53	32.0	2.70		43.5	385	442
12-11	0220-0320		43.5	387	444	8.5	73	84	74.0	17.02	19.53	32.0	2.70		42.5	375	430
12-11	0320-0420		43.5	387	444	8.0	63	73	74.0	17.02	19.53	32.0	2.70		41.5	365	419
12-11	0420-0520		46.5	417	477	8.5	73	84	74.0	17.02	19.48	31.5	2.65		41.0	360	412
12-11	0520-0620		45.0	402	461	7.5	53	61	74.0	17.02	19.53	32.0	2.70		40.5	355	407
12-11	0620-0720	—	47.0	422	483	8.0	63	72	74.0	17.02	19.48	31.5	2.65		41.0	360	412
12-11	1108-1200		44.0	394	450	7.2	43	49	71.5	16.53	18.89	31.0	2.62		38.2	332	379
12-11	1200-1300		47.5	429	490	7.5	49	56	71.5	16.53	18.89	31.0	2.62		40.2	352	402
12-11	1300-1400	—	46.0	414	474	7.5	49	56	71.5	16.53	18.94	31.5	2.67		36.5	315	361
12-11	1700-1800		50.0	452	517	19.0	69	79	72.8	16.71	19.12	31.5	2.64		31.5	265	303
12-11	1800-1900		46.5	417	477	19.0	69	80	73.5	16.89	19.35	31.8	2.67		31.5	265	304
12-11	1900-2000		45.5	407	463	19.0	69	79	74.0	17.01	19.35	30.5	2.54		32.5	275	313

GAS CONCENTRATION CALCULATION

Date 12-11-84 Operator ______

Test No. ______

Avg Gas Response, D_{avg}

Actual Gas Concentration, $Ga = (D_{avg} - Z_{avg}) \times G_s / (S_{avg} - Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21 - \%O_2)$

HI 20PPM/DIV

	TIME	LOCATION	NO$_x$			CO			CO$_2$			O$_2$			SO$_2$		
			D_{avg}	G_A	G_A@0%	D_{avg}	G_A	G_A@0%	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	G_A@0%
12-11	2000-2100		44.5	397	451	19.0	69	79									
12-11	2100-2200		41.5	367	418	22.0	84	96									
12-11	2200-2300		36.0	311	358	30.0	124	142									
12-11	2300-2400		24.0	191	223	→ ABV600	—	—									
12-12	2400-0100		22.0	171	201	→ ABV600	—	—									
12-12	0100-0200		22.0	171	201	→ ABV600	—	—									
12-12	0200-0300		25.5	206	239	→ ABV600	—	—									
12-12	0300-0400		33.0	281	322	70.0	322	368									
12-12	0400-0500		33.0	281	322	90.0	470	481									
12-12	0500-0600		35.0	301	344	90.0	420	480									
12-12	0600-0700	—	43.0	382	431	75.0	346	391									
12-12	0900-1000		49.0	443	504	7.5	50	57									
12-12	1000-1100		49.5	448	511	8.0	60	69									

(For data on CO$_2$, O$_2$, and SO$_2$, see page C-11)

GAS CONCENTRATION CALCULATION

Date 12-11-84 Operator ____________

Test No. ____________

Avg Gas Response, Davg

Actual Gas Concentration, Ga = $(D_{avg}-Z_{avg}) \times G_s/(S_{avg}-Z_{avg})$

Gas Concentration @ 0%, Ga@0% = $(G_A \times 21)/(21-\%O_2)$

HI 20PPM/DIV

		NO$_x$			CO			CO$_2$			O$_2$			SO$_2$		
TIME	LOCATION	D$_{avg}$	G$_A$	G$_A$@0%	D$_{avg}$	G$_A$	G$_A$@0%	D$_{avg}$	GA	Ga@0%	D$_{avg}$	Ga	Ga@0%	D$_{avg}$	G$_A$	G$_A$@0%
12-11 2000-2100								74.5	17.13	19.46	30.2	2.51		35.5	305	346
12-11 2100-2200								74.5	17.13	19.52	30.8	2.57		35.0	300	342
12-11 2200-2300								73.8	16.96	19.51	32.5	2.74		33.5	285	328
12-11 2300-2400								72.5	16.64	19.42	35.2	3.01		33.5	285	333
12-12 2400-0100								71.8	16.47	19.36	36.5	3.14		33.0	280	329.
12-12 0100-0200								72.0	16.52	19.47	37.0	3.19		32.5	275	324
12-12 0200-0300								72.5	16.64	19.30	34.0	2.89		34.0	290	336
12-12 0300-0400								73.8	16.96	19.40	31.5	2.64		35.0	300	343
12-12 0400-0500								74.0	17.01	19.46	31.5	2.64		35.0	300	343
12-12 0500-0600								74.5	17.13	19.55	31.0	2.59		34.5	295	337
12-12 0600-0700								75.0	17.26	19.48	29.0	2.39		30.0	250	282
12-12 0900-1000								72.5	17.20	19.57	30.5	2.55		26.0	210	237
12-12 1000-1100								72.0	17.07	19.48	31.0	2.60		25.5	205	234

(For data on NO$_x$ and CO, see page C-10)

GAS CONCENTRATION CALCULATION

Date 12-12-84

Test No. ______

Operator ______

Avg Gas Response, D_{avg}

Actual Gas Concentration, $Ga = (D_{avg} - Z_{avg}) \times G_s / (S_{avg} - Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21 - \%O_2)$

TIME	LOCATION	NO_x			CO			CO_2			O_2			SO_2		
		D_{avg}	G_A	G_A@0%	D_{avg}	G_A	G_A@0%	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	G_A@0%
12-12 1100-1200		48.5	438	501	8.0	60	69	71.0	16.82	19.24	31.5	2.65		28.2	232	266
12-12 1200-1300		49.0	443	507	7.5	50	57	70.5	16.69	19.10	31.5	2.65		27.5	225	257
12-12 1330-1430		46.5	418	478	8.0	60	69	71.0	16.82	19.24	31.5	2.65		25.5	205	235
12-12 1430-1530		45.0	402	463	14.0	180	208	70.0	16.56	19.05	32.5	2.75		28.0	230	265
12-12 1530-1630	—	26.0	211	248	35.0	601	707	68.5	16.18	19.01	36.0	3.13		27.5	225	264
12-12 1700-1800		41.5	368	429	15.0	200	234	72.0	16.34	19.05	35.0	2.99		27.0	220	257
12-12 1800-1900		41.5	368	429	17.0	241	280	73.0	16.58	19.33	35.0	2.99		25.5	205	237
12-12 1900-2000		41.5	368	429	17.0	241	280	73.5	16.70	19.47	35.0	2.99		25.5	205	237
12-12 2000-2100		37.5	328	383	17.0	241	281	73.2	16.63	19.44	35.5	3.04		24.5	195	228
12-12 2100-2200		32.5	277	335	15.0	200	242	71.5	16.22	19.61	41.5	3.63		23.5	185	224
12-12 2200-2300		31.5	267	337	14.0	180	227	69.0	15.60	19.66	48.5	4.33		23.0	180	227
12-12 2300-2400		33.5	287	373	11.0	120	156	67.5	15.24	19.79	53.5	4.83		23.0	180	234
12-13 2400-0100		33.5	287	385	9.5	90	121	65.5	14.75	19.76	58.5	5.33		22.5	175	235

GAS CONCENTRATION CALCULATION

Date 12-13-84 Operator ________

Test No. ________

Avg Gas Response, D_{avg}

Actual Gas Concentration, $Ga = (D_{avg} - Z_{avg}) \times G_s / (S_{avg} - Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21 - \%O_2)$

	TIME	LOCATION	NO_x			CO			CO_2			O_2			SO_2		
			D_{avg}	G_A	G_A@0%	D_{avg}	G_A	G_A@0%	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ga@0%	D_{avg}	G_A	G_A@0%
12-13	0100-0200		33.5	287	396	8.5	70	97	64.0	14.38	19.84	63.0	5.77		23.0	180	248
12-13	0200-0300		31.0	262	371	12.0	140	199	62.0	13.89	19.68	67.0	6.17		NO INK		
12-13	0300-0400		31.5	267	376	11.5	130	183	62.8	14.09	19.82	66.0	6.07		NO INK		
12-13	0400-0500		30.5	257	368	15.0	200	287	62.0	13.89	19.88	68.5	6.32		NO INK		
12-13	0500-0600		23.5	187	269	22.0	341	491	61.0	13.65	19.66	69.5	6.42		NO INK		
12-13	0600-0700		27.2	224	320	27.0	441	631	61.8	13.84	19.81	68.5	6.32		NO INK		

INSTRUMENT CALIBRATION

DATE 12-7-84
TEST NO. 1
TIME OF INITAL CALIBRATION 1340
TIME OF FINAL CALIBRATION 1640

Plant COMANCHE
Operator D.C.

HI RANGE
0-2000

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0 ~~25.0~~	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	5.0	5.3	4.8	5.3
Initial Span Response, S_i (Div)	86.5	25.0	99.0	85.0	85.0
Final Span Response, S_f (Div)	85.3	25.0	98.3	85.0	84.5
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.0	5.0	5.15	4.9	5.15
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	85.9	25.0	98.65	85.0	84.75
Zero Drift, (%) = $(Z_f - Z_i)$	0.0	0.0	0.3	-0.2	0.3
Span Drift, (%) = $(S_f - Z_f) - (S_i - Z_i)$	-1.2	0.0	-0.8	0.2	-0.8

INSTRUMENT CALIBRATION

DATE 12-7-84
TEST NO. 1
TIME OF INITAL CALIBRATION 1340
TIME OF FINAL CALIBRATION 1640

Plant COMANCHE
Operator D.C.

HI RANGE
0-2000

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0 ~~25.0~~	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	5.0	5.3	4.8	5.3
Initial Span Response, S_i (Div)	86.5	25.0	99.0	85.0	85.0
Final Span Response, S_f (Div)	85.3	25.0	98.3	85.0	84.5
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.0	5.0	5.15	4.9	5.15
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	85.9	25.0	98.65	85.0	84.75
Zero Drift, (%) $= (Z_f - Z_i)$	0.0	0.0	0.3	-0.2	0.3
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	-1.2	0.0	-0.8	0.2	-0.8

INSTRUMENT CALIBRATION

DATE 17-7-84

Plant COMANCHE

TEST NO. 1

Operator D.E.C

TIME OF INITAL CALIBRATION ~~[illegible]~~ 1700

TIME OF FINAL CALIBRATION 0730

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.45	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.3	5.0	5.3
Final Zero Response, Z_f (Div)	5.1	4.8	5.3	4.5	5.1
Initial Span Response, S_i (Div)	85.3 ~~[illegible]~~	25.0	98.3	85.0	84.5
Final Span Response, S_f (Div)	86.3	25.0	96.5	84.6	82.0
Avg. Zero Response, Z_{avg} (Div) = $(Z_i + Z_f)/2$	5.05	4.9	5.3	4.75	5.2
Avg. Span Response, S_{avg} (Div) = $(S_i + S_f)/2$	85.8	25.0	97.4	84.8	83.25
Zero Drift, (%) = $(Z_f - Z_i)$	0.1	-0.2	0.0	-0.5	-0.2
Span Drift, (%) = $(S_f - Z_f) - (S_i - Z_i)$	0.9	0.2	-1.8	0.1	-2.3

INSTRUMENT CALIBRATION

DATE 12-8-84

TEST NO. 2

TIME OF INITAL CALIBRATION 0900

TIME OF FINAL CALIBRATION 1718

Plant COMANCHE

Operator D.E.C.

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	5.0	5.0	5.5	5.0
Initial Span Response, S_i (Div)	86.3	25.0	99.0	85.0	85.0
Final Span Response, S_f (Div)	86.5	25.0	99.1	85.6	71.0
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.0	5.0	5.0	5.25	5.0
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	86.4	25.0	99.05	85.3	78.0
Zero Drift, (%) $= (Z_f - Z_i)$	0.0	0.0	0.0	0.5	0.0
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	0.2	0.0	0.1	0.1	-14.0

INSTRUMENT CALIBRATION

DATE 12-9-84
TEST NO. ~~[illegible]~~ 3
TIME OF INITAL CALIBRATION ~~1445~~ 1330
TIME OF FINAL CALIBRATION 0724

Plant COMANCHE
Operator DEC

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	5.0	5.0	5.0	5.0
Initial Span Response, S_i (Div)	86.3	25.0	98.8	85.0	85.0
Final Span Response, S_f (Div)	85.8	25.0	97.0	85.0	82.0
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.0	5.0	5.0	5.0	5.0
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	86.05	25.0	97.9	85.0	83.5
Zero Drift, (%) = (Z_f-Z_i)	0.0	0.0	0.0	0.0	0.0
Span Drift, (%) = $(S_f-Z_f)-(S_i-Z_i)$	-0.5	0.0	-1.8	0.0	-3.0

INSTRUMENT CALIBRATION

DATE 12-10-84
TEST NO. 4
TIME OF INITAL CALIBRATION 0745
TIME OF FINAL CALIBRATION 1650

Plant COMANCHE
Operator DEC

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.93	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	5.0	5.0	5.3	4.8
Initial Span Response, S_i (Div)	86.2	25.0	99.0	85.0	87.0
Final Span Response, S_f (Div)	86.4	25.0	96.0	85.0	85.0
Avg. Zero Response, Z_{avg} (Div) = $(Z_i + Z_f)/2$	5.0	5.0	5.0	5.15	4.9
Avg. Span Response, S_{avg} (Div) = $(S_i + S_f)/2$	86.3	25.0	97.5	85.0	86.0
Zero Drift, (%) = (Z_f-Z_i)	0.0	0.0	0.0	0.3	-0.2
Span Drift, (%) = $(S_f-Z_f)-(S_i-Z_i)$	0.2	0.0	-3.0	-0.3	-1.8

INSTRUMENT CALIBRATION

DATE 12-10-84
TEST NO. 4
TIME OF INITAL CALIBRATION 1705
TIME OF FINAL CALIBRATION 0735

Plant COMANCHE
Operator DEC

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	4.8	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	4.8	5.2	5.0	5.0
Initial Span Response, S_i (Div)	86.5	24.8	99.0	85.0	87.0
Final Span Response, S_f (Div)	86.8	24.4	101.0	84.9	85.8
Avg. Zero Response, Z_{avg} (Div) = $(Z_i + Z_f)/2$	5.0	4.9	5.0	5.0	5.0
Avg. Span Response, S_{avg} (Div) = $(S_i + S_f)/2$	86.65	24.6	100	84.95	86.4
Zero Drift, (%) = (Z_f-Z_i)	5.0	-0.2	0.4	0.0	0.0
Span Drift, (%) = $(S_f-Z_f)-(S_i-Z_i)$	0.3	-0.2	1.6	-0.1	-1.2

INSTRUMENT CALIBRATION

DATE 12-11-84
TEST NO. 5
TIME OF INITAL CALIBRATION 0750
TIME OF FINAL CALIBRATION 1614

Plant COMANCHE
Operator DEC

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	5.1	5.7	4.7	5.0
Initial Span Response, S_i (Div)	86.3	25.0	99.0	85.0	87.0
Final Span Response, S_f (Div)	86.1	25.1	99.2	84.5	85.5
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.0	5.05	5.35	4.85	5.0
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	86.2	25.05	99.1	84.75	86.25
Zero Drift, (%) $= (Z_f - Z_i)$	0.0	0.1	0.7	-0.3	0.0
Span Drift, (%) $= (S_f - Z_f) - (S_i - Z_i)$	-0.2	0.0	-0.5	-0.2	-1.5

INSTRUMENT CALIBRATION

DATE 17-11-84

TEST NO. 5

TIME OF INITAL CALIBRATION 1628

TIME OF FINAL CALIBRATION 0725

Plant COMANCHE

Operator DEC

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	4.9	5.2	5.0	5.2
Initial Span Response, S_i (Div)	86.3	86.0 ~~85.0~~	99.0	85.0	87.0
Final Span Response, S_f (Div)	87.0	86.5	101.0	85.6	86.5
Avg. Zero Response, Z_{avg} (Div) = $(Z_i + Z_f)/2$	5.0	4.95	5.1	5.0	5.1
Avg. Span Response, S_{avg} (Div) = $(S_i + S_f)/2$	86.5	86.25	100.0	85.3	86.75
Zero Drift, (%) = (Z_f-Z_i)	0.0	-0.1	0.2	0.0	0.2
Span Drift, (%) = $(S_f-Z_f)-(S_i-Z_i)$	0.7	0.6	1.8	0.6	-0.7

12.5.
4%

INSTRUMENT CALIBRATION

DATE 12-12-84
TEST NO. 6
TIME OF INITAL CALIBRATION 0742
TIME OF FINAL CALIBRATION 1640

Plant COMANCHE
Operator DEC

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	5.0	4.8	5.1	5.0
Initial Span Response, S_i (Div)	86.5	25.0	99.0	85.0	87.0
Final Span Response, S_f (Div)	86.5	25.1	95.0	85.0	85.5
Avg. Zero Response, Z_{avg} (Div) = $(Z_i + Z_f)/2$	5.0	5.0	4.9	5.05	5.0
Avg. Span Response, S_{avg} (Div) = $(S_i + S_f)/2$	86.5	25.05	97.0	85.0	86.25
Zero Drift, (%) = (Z_f-Z_i)	0.0	0.0	-0.2	0.1	0.0
Span Drift, (%) = $(S_f-Z_f)-(S_i-Z_i)$	0.0	0.1	-3.8	-0.1	-1.5

INSTRUMENT CALIBRATION

DATE 12-12-84 12/13/84
TEST NO. 6
TIME OF INITAL CALIBRATION 1653
TIME OF FINAL CALIBRATION 0734

Plant COMANCHE
Operator DEC

	NO_x	CO	CO_2	O_2	SO_2
Span Gas Concentration, Gs	812.4	401.9	23.43	8.0	820
Initial Zero Response, Z_i (Div)	5.0	5.0	5.0	5.0	5.0
Final Zero Response, Z_f (Div)	5.0	5.0	5.4	5.0	5.3
Initial Span Response, S_i (Div)	86.3	25.0	99.0	85.0	87.0
Final Span Response, S_f (Div)	86.3	25.1	103.0	85.7	86.0
Avg. Zero Response, Z_{avg} (Div) $= (Z_i + Z_f)/2$	5.0	5.0	5.2	5.0	5.15
Avg. Span Response, S_{avg} (Div) $= (S_i + S_f)/2$	86.3	25.05	101.0	85.35	86.5
Zero Drift, (%) = $(Z_f - Z_i)$	0.0	0.0	0.4	0.0	0.3
Span Drift, (%) = $(S_f - Z_f) - (S_i - Z_i)$	0.0	0.1	3.6	0.7	-1.3

-54

80.7 - 82.0
-1.3

COMMANCHE DATA SUMMARY WITH POINTS TAKEN OFF STRIP CHART TO CORRESPOND TO INSTANTANEOUS CONTROL ROOM READINGS

Data Summary

1430 292.89MW

1500 319.43MW

1530 314.17MW

POINT NUMBER	LOAD MWe	tons/hr COAL FLOW lb/hr	MILL OUT OF SERVICE	O_2 %	NO_x ppm@0%O_2	CO ppm@0%O_2		
1445-1455	270	147.82	—	2.70	503	46	12-12 10%	270
1455-1505	295	147.82	—	2.65	496	80	" 20%	
1505-1515	291	147.82	—	2.55	494	125	" 30%	
1515-1525	285	147.82	—	2.70	366	299	" 40%	
1525-1535	294	148.72	—	2.75	304	923	" 50	
1535-1545	302	148.72	—	2.85	271	1102	" 60	
1545-1555	315	—	—	2.90	260	1512	" 70	35MW
1555-1610	305	—	—	3.15	258	590	" 80	
1610-1620	295	—	—	3.15	240	755	" 90	
1620-1630	293	—	—	3.15	223	825	" 100%	

NO_x vs OFA % open

Comanche Data Summary - All Mills in service

	POINT NUMBER	LOAD MWe	COAL FLOW 2000 lb/hr	MILL OUT OF SERVICE	O_2 %	NO_x ~~ppm@0% O_2~~	CO ~~ppm@0% O_2~~	NOx 0%	CO 0%	
12-11	1100	257 ✓°	150.42	—	31 260	428	46	428	46	OFA closed
	1130	263 ✓°	150.02	—	31.5 2.65	441	57	441	57	
	1300	290 ✓	150.19	—	31.5 2.65	503	57	503	57	
	1330	262 ✓°	150 ~~[illegible]~~	—	31.5 2.65	435	57	435	57	
	1400	262 ✓°	149 ~~[illegible]~~	—	30 2.50	426	68	426	68	
	1430	261 ✓°	149 ~~[illegible]~~	—	32 2.70	442	46	442	46	
12-8	1300	269 ✓	131	-	3.25	455	59	OFA closed		
	1330	253 ✓°	131	-	3.2	437	59			
	1400	259 ✓°	131	-	3.25	444	59			
	1430	268 ✓	131	-	3.2	448	59			
	1500	265 ✓°	(131.5) 132	-	3.25	450	71			
	1530	254 ✓°	132	-	3.25	450	59			
	1600	252 ✓°	132	-	3.40	430	72			
12-10	830	334	138	-	4.05	514	62	OFA OPEN		
	900	336	141	-	3.95	523	62			
	930	360	143	-	3.95	536	62	*		
	1000	345	145	-	3.90	540	49	OFA CLOSED *		
	1030	329 ✓	146	-	3.95	542	49			
	1100	333	148	-	3.85	533	49			
	1300	301 ✓	149	-	2.70	493	46			
	1330	296 ✓	149	-	2.75	495	46			

○ Full load - Hi Excess Air
△ Full load - Lo Excess Air
□

Comanche Data Summary

POINT NUMBER	LOAD MWe	COAL FLOW lb/hr	MILL OUT OF SERVICE	O_2 %	NO_x	CO	NO_x 0% O_2	CO 0% O_2
12-10 0830	334.	138.28	—	45.5 4.05	[illegible] 415	7.5 50	514	62
0900	336.	140.51	—	44.5 3.95	47.0 425	7.5 50	523	62
0930	360.	143.07	—	44.5 3.95	48.5 435	7.5 50	536	62
1000	345	144.89	—	44 3.90	47 440	7 40	540	49
1030	329	146.27	—	44.5 3.95	49 440	7 40	542	49
1100	333.	147.52	—	43.5 3.85	48.5 435	7 40	533	49
1300	301.	149.13	—	32 2.70	48 430	7 40	493	46
1330	296.	149.32	—	32.5 2.75	48 430	7 40	495	46
1500	273	149.04	2A	34 2.90	36.5 315	—	363	—
1530	261.	148.75	2A	33 2.80	35 300	—	346	—
1600	273	148.67	2A	32.5 2.75	36.5 315	—	362	—
1630	281.	148.69	2A	35 3.0	35 300	—	[illegible]	—
12-11 ~~0830~~								

OFA open

OFA closed

OFA open

NATIONAL 42 381 50 SHEETS 5 SQUARE 42 382 100 SHEETS 5 SQUARE 42 389 200 SHEETS 5 SQUARE

Comanche Data Summary

12-11

POINT NUMBER	LOAD MWe	COAL FLOW lb/hr	MILL OUT OF SERVICE	O_2 %	NO_x ~~ppm@0%O_2~~	CO ~~ppm@0%O_2~~	NO_x 0%	CO 0%
1100	257	150.42	—	31 2.60	42.5 375	7 40	428	46
1130	263	150.02	—	31.5 2.65	43.5 385	7.5 50	441	57
1300	290	150.19	—	31.5 2.65	49 440	7.5 50	503	57
1330	262	149.86	—	31.5 2.65	41.5 380	7.5 50	435	57
1400	262	149.47	—	30 2.50	42.5 375	8 60	426	68
1430	261	148.86	—	32 2.70	43.5 385	7 40	442	46

OFA closed

42 381 50 SHEETS 5 SQUARE
42 382 100 SHEETS 5 SQUARE
42 389 200 SHEETS 5 SQUARE
NATIONAL

Comanche Data Summary

12-12

OFA closed

POINT NUMBER	LOAD MWe	COAL FLOW lb/hr	MILL OUT OF SERVICE	O_2 %	NO_x ~~ppm@3%O_2~~	CO ~~ppm@3%O_2~~	NOx 0%	CO 0%
800	334	136	—	30.5 2.55	51 460	7.5 50	524	57
830	319	138	—				1A NT.	
900	321	140	—	31 260	50.5 455	7 40	519	46
930	307	141	—	30 2.50	48.5 435	7.5 50	494	57
1000	318	142	—	31 2.60	49 440	8.5 70	502	80
1030	318	143	—	32 2.70	50 450	7.5 50	516	57
1100	293	144	—	31 2.6	48 430	8 60	491	70
1130	305	145	—	31 2.6	48 430	8 60	491	68
1300	297	146	—	31 2.6	48.5 435	7.5 50	496	57
1330	306	147	—	31.5 2.65	48.5 435	7 40	498	46
1400	290	147	—	32 2.7	45.5 405	8.5 70	465	80
1430	291	147	—	32.5 2.75	47.0 420	8 60	483	69
~~1500~~	~~319~~	~~148~~						
~~1530~~	~~343~~	~~149~~	OFA test					
	306	494						
	319	512						

Comanche Data Summary

	POINT NUMBER	LOAD MWe	COAL FLOW lb/hr	MILL OUT OF SERVICE	O_2 %	NO_x ~~ppm @0%O_2~~	CO ~~ppm @0%O_2~~	NO_x 0%O_2	CO 0%O_2
12-7	~~12-7 1345~~	~~265~~	~~139.8~~	~~2 A~~	~~[illegible] 3.4~~	~~[illegible] 175~~	~~40 [illegible]~~	~~209~~	~~13.3~~
	1400	259	139.74	2 A	37.5 3.25	32.5 275	14 170	325	213
	1415	257	139.67	2A	37.0 3.2	32.5 275	18 [illegible]	324	307
	1430	259	139.55	2A	37.5 3.25	36.5 315	14 180	373	213
	1445	227	139.27	2 A	38.5 3.3	[illegible] 250	17 285	332	332
	1500	231	139.04	2 A	36.5 3.15	32.5 275	18 260	323	306
	1515	238	138.82	2 A	36.0 3.10	32 250	[illegible] 170	328	199
	1530	210	138.38	2 A	38.5 3.35	31.5 265	15.0 200	315	238
	1545	210.	137.97	2 A	37.5 3.25	31.5 265	14.5 170	314	225
	1615	209	137.17	2 A	37.0 3.20	[illegible] 250	14 180	295	212
12-8	0930	152.	128.70	2 A	38.5 3.35	33.5 285	17.5 250	339	297
	1000	232	127.77	2 A	37 3.4	30.5 255	[illegible] 260	304	310
	1030	267	128.99	2 A	38.5 3.35	33.5 285	25 400	339	476
	~~1100~~	~~286~~	~~129.86~~	~~2 A~~	~~38 3.30~~	~~[illegible] 205~~	~~[illegible] 200?~~	~~243~~	~~? 2720~~
	~~1130~~	~~264~~	~~130.07~~	~~2A~~	~~37 3.2~~	~~[illegible] 375~~	~~7.5 50~~	~~442~~	~~59~~
12-8	1300	269	130.72	—	37.5 3.25	[illegible] 385	7.5 50	455	59
	1330	257	130.76	—	37 3.2	42 370	7.5 50	437	59
	1400	259.	131.01	—	37.5 3.25	42.5 375	7.5 50	~~444~~	59
	1430	268	131.31	—	37 3.2	43 380	7.5 50	448	59
	1500	265.	131.51	—	37.5 3.25	43 380	8 60	450	71
	1530	254	131.53	—	38.5 3.35	41 360	7.5 50	450	59
	1600	252.	131.54	—	39 3.40	41 360	8 60	430	72

OFA closed

closed

451

439

Comanche Data Summary - All Mills in Service

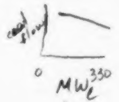
12-12

POINT NUMBER	LOAD MWe	COAL FLOW 2000 lb/hr	MILL OUT OF SERVICE	O_2 %	NO_x ~~ppm@%O_2~~	CO ~~ppm@%O_2~~	NO_x 0%	CO 0%
800	334	136	—	30.5 2.55			524	57
830	319	138	=				MAINT.	
900	321	140	—	31 2.60			519	46
930	307	141	—	30 2.50			494	57
1000	318	142	—	31 2.60			502	80
1030	318	143	—	32 2.70			516	57
1100	293	144	—	31 2.6			491	70
1130	305	145	—	31 2.6			491	68
1300	297	146	—	31 2.6			496	57
1330	306	147	—	31.5 2.65			498	46
1400	290	147	—	32 2.7			465	80
1430	291	147	—	32.5 2.75			483	69

OFA

correlation this page only

coal flow ton/hr = .227 load, MW + 213



	306	494
	319	512

EXXON – Comanche Data Summary

100pos

POINT NUMBER	LOAD MWe	COAL FLOW lb/hr	MILL OUT OF SERVICE	O_2 %	NO_x ppm@0% O_2	CO ppm@0% O_2	OFA % of [illegible]	
5-31 - 1	350	/	—	4.6	446	168	60	
2	350	/	—	4.4	370	238	80	
6-1 - 3	352.5	439.75	—	4.4	476	106	70	
4	356.5	501.25	—	4.9	670	26	20	
5	357.5	499.5	—	5.2	847	22	0	
6	355	449	—	4.5	324	74	100	
6-2 - 7	352.5	489.75	—	5.2	505	21	80	☐
8	355.5	560.5	—	5.7	839	16	20	☐
9	353.5	—	—	5.7	615	16	50	☐
10	350.5	398.25	—	4.8	406	79	80	
6-3 - 11	274	308	—	5.4	467	16	40	△
12	275.5	381.5	—	5.6	708	14	0	△
13	272.5	368.5	—	5.0	362	19	80	△
6-7-14	347.5	—	—	4.8	415	93	100	☐
14A	348.5	471	—	4.7	379	163	100	
6-9 – 15a	354.0	476.5	—	6.9	715	106	30	☐
〃 -15b	354.0	476.5	—	5.4	715	163	30	☐
6-14-16	336	56.75	—	4.9	570	23	30	

coal flow = 1.58 load -83.5

corr fact = 0.82

C-2

COMANCHE BOILER OPERATING DATA
MONITORED BY B&W SERVICE ENGINEER

PLANT OPERATING DATA

DATA ITEM	UNITS		2	→			
Test No.			ONLOAD DEMAND	→			
Date			12/7/84	→			
Time	Hours		1030	1045	1100	1130	
UNIT LOAD GROSS	MW		282	282	280	278.8	
		COMPUTER					
BOILER TEMPERATURES		(POINTS)					
~~Water to Econ~~	~~F~~	(509)	461.0	461.0	460.9	459.9	
Water Lvg Econ	F	(311)	548.8	548.4	550.2	549.6	
Stm Lvg Pri SH	F	514/515	753.7/753.0	760.7/759.8	759.8/758.3	759.1/749.6	
Stm Ent Plat SH	F	—	—	—	—	—	
Stm Lvg Plat SH	F	—	—	—	—	—	
Stm Ent Sec SH	F	(7 / 8)	753/751.4	752.6/758	745/747	739.3/743.4	
Stm Lvg Sec SH	F	(9)	1013.4	1022.6	1003.2	1009.2	
Stm to RH Attemp	F	(11)	617.3	621.7	608.6	606.7	
Stm Lvg RH Attemp	F	(511)	547.4	550.7	529.3	548.2	
Stm Lvg RH	F	(602)	1013.2	1015.4	1001.6	994.4	
Water to SH Attemp	F	(507)	261.3	262.1	262.0	262.2	
Water to RH Attemp	F	(507)	261.3	262.1	262.0	262.2	
BOILER PRESSURES							
Water to Econ	PSIG	(605)	2660.5	2670.5	2678.5	2684.5	
Drum Press	PSIG	(606)	2531.2	2529.6	2524.8	2537.7	
PSH in Press	PSIG	—	–	–	–	–	
Stm Lvg Sec SH	PSIG	601	2394.8	2399.0	2392.7	2401	
RH Inlet	PSIG	604	464.2	464.2	464.2	464	
RH Outlet	PSIG	603	413.7	413.7	413.7	413.4	
HIGH PRESS FW HEATERS							
FW Lvg #1 Htr	F	—					
FW Ent #1 Htr	~~F~~°C	(3)	128.3	128.5	128.2	128.4	
FW Ent #2 Htr	~~F~~ C	(5)	150.5	150.5	150.2	150.2	
#1 Htr Drain	~~F~~ C	(4)	134.3	134.2	133.9	134.1	
#2 Htr Drain	~~F~~ C	(6)	160.3	159.8	159.8	160.1	
Stm to #1 Htr - Temp	F ~~F~~ ~~C~~	(1)	603.4	607.1	596.3	600.5	
Stm to #1 Htr - Press	PSIG	LOCAL	74	73	72	70	
Stm to #2 Htr - Temp	F ~~F~~ ~~C~~	(2)	798.8	802.1	790.6	795.5	
Stm to #2 Htr - Press	PSIG	LOCAL	174	173	171	169	
FW ENT #3 HTR TEMP	C	(7)	191.9	191.5	191.4	191.2	
STM TO #3 HTR TEMP	~~C~~ F	(10)	546.3	552.0	543.8	548.5	
STM TO #3 HTR PRESS	PSIG	LOCAL	440	440	430	430	
#3 HTR DRAIN TEMP	C	(8)	198.5	197.9	197.7	197.8	

JOB NUMBER: RB - 502

CUSTOMER: PUBLIC SERVICE OF COLORADO
PUEBLO COLORADO

BY: SVT.

DATA ITEM	UNITS						
Test No.			2	→	→	→	→
			ON LOAD DEMAND	→	→	→	→
Date			12/7/84	→	→	→	→
Time	Hours		1030	1045	1100	1130	
		Computer					
AIR & GAS TEMPERATURES		(POINTS)					
② Flue Gas Lvg Econ	F	(24/25)	604.2/609.5	606/613	595.6/622	597.3/601.9	
③ Flue Gas Lvg AH	F	(20/21)	264.2/262.9	267/262	268.4/265.4	270.3/272	
④ Flue Gas Lvg Hot Precip	F	(26/27)	558.9/557.7	564/565	563.8/563.4	564.3/534.3	
③ Flue Gas Lvg Pri AH	F	—					
Air Lvg FD Fan	F	(12/13)	69.0/69.2	70.7/70.7	72.2/72.5	74/74.3	
⑤ Air Ent Sec AH	F	(14/15)	112.2/117.0	114/118	116.5/120.6	117.4/121.9	
⑥ Air Lvg Sec AH	F	(22/23)	514/507.5	522/511	523.4/512.8	525.1/514.9	
Air Lvg PA Fan	F	—					
⑤ Air Ent Pri AH	F	—					
⑥ Air Lvg Pri AH	F	—					
Air Ent Pulv	F	—					
① Ambient Air	F	[18(I)]	58.1	58.5	59.2	61.8	
MISCELLANEOUS							
Feedwater Flow	LB/HR	(702)	1713.4	1675.6	1738.6	1708.1	
SH Spray Flow	LB/HR	(704)	—	—	7.9	8.22	
RH Spray Flow	LB/HR	(703)	38.51	38.71	42.3	34.82	
SH Spray Valve Posit	%						
RH Spray Valve Posit	%						
* HP Extraction Flow	LB/HR						
⑨ O_2 Lvg Econ	%	(306/307)	2.99/3.1	2.97/3.35	2.91/3.46	3.07/3.21	
⑧ CO_2 Lvg Econ	%						
NOx (if avail)							
⑨ O_2 Lvg AH	%						
⑧ CO_2 Lvg AH	%						
O_2 Lvg Hot Precip	%						
CO_2 Lvg Hot Precip	%						
O_2 in Windbox	%						
CO_2 in Windbox	%						
NOx or CFA Port Posit							
+ Fuel Analysis							
Burner # Out Serv							
(22) Relative Humidity	%						

Advise location of flow nozzle with respect to SH and RH spray take-off.

* - Any high pressure steam extraction upstream of reheater, excluding FW heaters.

+ - Report data available - specific requirements will be requested.

② - Efficiency data

DATA ITEM	UNITS		2				
Test No.			ONLOAD DEMAND				
Date			12/7/84				
Time	Hours		1030	1045	1100	1130	
DRAFT LOSS DATA							
FD Fan Disch	" Wg						
SCAH In (Out)	" Wg						
AH Air In	" Wg						
AH Air Out	" Wg						
Windbox	" Wg						
Furnace	" Wg						
Econ Out	" Wg						
AH Gas In	" Wg						
AH Gas Out	" Wg						
Precip In	" Wg						
Precip Out	" Wg						
ID Fan In	" Wg						
SH Outlet Leg TC's	F						
RH Outlet Leg TC's	F						
PULVERIZER DATA							
Pulverizer #							
㉓ * Coal Flow	TONS/HR ~~MLB/HR~~	813	140.28	140.54	140.71	141.07	
* Pri Air Flow	MLB/HR						
* Sec Air Flow	MBL/HR						
Pulv Amps	AMPS						
Pulv Diff	" Wg						
PA Inlet Temp	F						
Pulv Out Temp	F						
PA Flow Damp	%						
PA Temp Cont Damp	%						
Pri Air Fan Amps	AMPS						

The DRAFT LOSS DATA listed on this page is of value, but not absolutely essential for performance analysis.
* - When indicator scale is in different units, provide conversion factor.
② - Efficiency data

PLANT OPERATING DATA

DATA ITEM	UNITS						
Test No.			2	→			→
Date			UNIT ON LOAD DEMAND, LOW 210MW, HI 280 MW 12/7/84	→			→
Time	Hours		1345	1400	1415	1430	1445
UNIT LOAD GROSS	MW		265	259	257	259	227
BOILER TEMPERATURES		COMPUTER (POINTS)					
~~Water to Econ~~	F	(509)	454.5	451.7	450.6	450.7	438.8
Water Lvg Econ	F	(311)	542.5	535.9	535.1	530.6	520.8
Stm Lvg Pri SH	F	(514/515)	751.4/749	740.8/740.6	743.2/734.5	737/736.4	725.6/724.9
Stm Ent Plat SH	F	—	—	—	—	—	
Stm Lvg Plat SH	F	—	—	—	—	—	
Stm Ent Sec SH	F	(7/8)	747/745	734/729	734/731	739/738	726/725
Stm Lvg Sec SH	F	(9)	983	963	974	983	951
Stm to RH Attemp	F	(11)	584	565	563	575	548
Stm Lvg RH Attemp	F	(511)	576.8	562.4	560.1	557.5	540.7
Stm Lvg RH	F	(602)	982.4	976.2	966.8	965.8	954.2
Water to SH Attemp	F	(507)	257.9	257.7	257.1	255.7	252.2
Water to RH Attemp	F	(507)	257.9	257.7	257.1	255.7	252.2
BOILER PRESSURES							
Water to Econ	PSIG	(605)	2676.5	2690.6	2678.5	2658.4	2660.5
Drum Press	PSIG	(606)	2528.0	2542.6	2526.4	2516.7	2518.3
PSH in Press	PSIG	—	—	—	—	—	—
Stm Lvg Sec SH	PSIG	601	2402.1	2415.6	2404.2	2390.6	2408.3
RH Inlet	PSIG	604	429.5	421.9	421.6	421.7	372.0
RH Outlet	PSIG	603	377.2	369.2	368.9	369	316.9
HIGH PRESS FW HEATERS							
FW Lvg #1 Htr	F	—					
FW Ent #1 Htr	~~F~~ C	(3)	127	126	126	126	123
FW Ent #2 Htr	~~F~~ C	(5)	149	148	147	147	144
#1 Htr Drain	~~F~~ C	(4)	132	132	132	131	128
#2 Htr Drain	~~F~~ C	(6)	158	157	156	157	153
Stm to #1 Htr - Temp	F	(1)	582	577	568	568	567
Stm to #1 Htr - Press	PSIG	LOCAL	67	66	64	65	58
Stm to #2 Htr - Temp	F	(2)	775	768	758	760	757
Stm to #2 Htr - Press	PSIG	LOCAL	163	160	156	158	142
FW ENT #3 HTR TEMP	C	(7)	189	188	187	739	726
STM TO #3 HTR TEMP	F	(10)	575	556	553	564	537
STM TO #3 HTR PRESS	PSIG	LOCAL	420	400	400	400	370
#3 HTR DRAIN TEMP	C	(8)	196	194	193	194	189

JOB NUMBER: RB-502

CUSTOMER: PUBLIC SERVICE OF COLORADO
PUEBLO COLORADO

BY: SVT.

NOTE: EER TESTING
STARTED 1315 HRS
DEC. 7. 1984
OVERFIRE AIRPORTS CLOSED
AT 1400 HRS.

1

	DATA ITEM	UNITS		2				
	Test No.				—	—	—	→
	Date			12/7/84	—	—	—	→
	Time	Hours		1345	1400	1415	1430	1445
	AIR & GAS TEMPERATURES		COMPUTER (POINTS)					
④	**Flue Gas Lvg Econ**	F	(24/25)	585/592	576/585	575/582	578/587	566/575
③	**Flue Gas Lvg AH**	F	(20/21)	265/264	267/265	268/267	268/268	268/265
④	Flue Gas Lvg Hot Precip	F	(26/27)	548/549	547/549	548/549	547/550	544/547
③	Flue Gas Lvg Pri AH	F	—					
	Air Lvg FD Fan	F	(12/13)	79/80	80/81	81/82	81.2/81.7	82/83
⑤	Air Ent Sec AH	F	(14/15)	122/127	124/130	126/131	124/129	129/135
⑥	Air Lvg Sec AH	F	(22/23)	510/502	509/505	511/505	509/505	510/507
	Air Lvg PA Fan	F	—					
⑤	Air Ent Pri AH	F	—					
⑥	Air Lvg Pri AH	F	—					
	Air Ent Pulv	F	—					
①	Ambient Air	F	[18(I)]	66.4	64.8	62.9	64.2	63.7
	MISCELLANEOUS							
	Feedwater Flow	LB/HR	(702)	1679.4	1692.0	1670	1625.6	1446.8
	SH Spray Flow	LB/HR	(704)	—	—	—	—	—
	RH Spray Flow	LB/HR	(703)	—	—	—	—	—
	SH Spray Valve Posit	%						
	RH Spray Valve Posit	%						
	*HP Extraction Flow	LB/HR						
⑨	O_2 Lvg Econ	%	(306/307)	2.85/3.26	3.11/3.18	3.07/2.90	2.9/3.36	3.03/3.09
⑧	CO_2 Lvg Econ	%						
	NOx (if avail)							
⑨	O_2 Lvg AH	%						
⑧	CO_2 Lvg AH	%						
	O_2 Lvg Hot Precip	%						
	CO_2 Lvg Hot Precip	%						
	O_2 in Windbox	%						
	CO_2 in Windbox	%						
	NOx or CFA Port Posit							
	+ Fuel Analysis							
	Burner # Out Serv							
㉒	Relative Humidity	%						

Advise location of flow nozzle with respect to SH and RH spray take-off.

* - Any high pressure steam extraction upstream of reheater, excluding FW heaters.

+ - Report data available - specific requirements will be requested.

② - Efficiency data

DATA ITEM	UNITS		2	→			
Test No.							
Date			12/7/84	→			
Time	Hours		1345	1400	1415	1430	1445
		COMPUTER					
		POINTS					
DRAFT LOSS DATA							
FD Fan Disch	" Wg						
SCAH In (Out)	" Wg						
AH Air In	" Wg						
AH Air Out	" Wg						
Windbox	" Wg						
Furnace	" Wg						
Econ Out	" Wg						
AH Gas In	" Wg						
AH Gas Out	" Wg						
Precip In	" Wg						
Precip Out	" Wg						
ID Fan In	" Wg						
SH Outlet Leg TC's	F						
RH Outlet Leg TC's	F						
PULVERIZER DATA							
Pulverizer #							
㉓ * Coal Flow	MLB/HR	813	139.80	139.74	139.67	139.55	139.27
* Pri Air Flow	MLB/HR						
* Sec Air Flow	MBL/HR						
Pulv Amps	AMPS						
Pulv Diff	" Wg						
PA Inlet Temp	F						
Pulv Out Temp	F						
PA Flow Damp	%						
PA Temp Cont Damp	%						
Pri Air Fan Amps	AMPS						
MILL A COAL/AIR TEMP	F	(16)	MILL	2-A	OFF-LINE →		
B COAL/AIR TEMP	F	(17)	115	116	116	115	117
C COAL/AIR TEMP	F	(18)	121	121	122	120	122
D COAL/AIR TEMP	F	(19)	123	123	124	123	124
E COAL/AIR TEMP	F		N/A	→			

The DRAFT LOSS DATA listed on this page is of value, but not absolutely essential for performance analysis.
* - When indicator scale is in different units, provide conversion factor.
② - Efficiency data

PLANT OPERATING DATA

DATA ITEM	UNITS		2	→			
Test No.							
Date			12/7/84	→			
Time	Hours		1500	1515	1530	1545	1615
UNIT LOAD GROSS	MW		231	238	209.5	210.2	208.6
BOILER TEMPERATURES		COMPUTER (POINTS)					
Water to Econ	F	(509)	441.2	443.7	432.9	432.9	423.3
Water Lvg Econ	F	(311)	521.7	522.1	510.8	510.7	509.0
Stm Lvg Pri SH	F	514/515	733.6/732	734.1/730	720.7/718.7	724.3/723.5	723.3/720.5
Stm Ent Plat SH	F	—	—	—	—	—	—
Stm Lvg Plat SH	F	—	—	—	—	—	—
Stm Ent Sec SH	F	(7/8)	727/729	733/731	724/721	725/722	724/722
Stm Lvg Sec SH	F	(9)	978	979	958	960	968
Stm to RH Attemp	F	(11)	560	563	541	543	545
Stm Lvg RH Attemp	F	(511)	548.5	552.1	529.9	528.9	523.5
Stm Lvg RH	F	(602)	959.9	966.5	940.4	943.9	920.4
Water to SH Attemp	F	(507)	251.2	250.9	247.1	246.3	245.5
Water to RH Attemp	F	(507)	251.2	250.9	247.1	246.3	245.5
BOILER PRESSURES							
Water to Econ	PSIG	(605)	2650.4	2658.4	2628.3	2646.4	2636.4
Drum Press	PSIG	(606)	2513.5	2503.8	2494.1	2482.8	2474.7
PSH in Press	PSIG	—	—	—	—	—	—
Stm Lvg Sec SH	PSIG	601	2406.3	2399	2406.3	2396.9	2397.9
RH Inlet	PSIG	604	379.1	386.2	343.7	343.8	343.7
RH Outlet	PSIG	603	324.3	331.8	287.1	287.2	287.1
HIGH PRESS FW HEATERS							
FW Lvg #1 Htr	F	—					
FW Ent #1 Htr	~~F~~ C	(3)	123	123	121	121	120
FW Ent #2 Htr	~~F~~ C	(5)	144	144	141	-141	141
#1 Htr Drain	~~F~~ C	(4)	128	129	126	125	125
#2 Htr Drain	~~F~~ C	(6)	152	153	149	149	149
Stm to #1 Htr - Temp	F	(1)	562	567	554	554	541
Stm to #1 Htr - Press	PSIG	LOCAL	58	54	54	54	54
Stm to #2 Htr - Temp	F	(2)	753	759	741	743	728
Stm to #2 Htr - Press	PSIG	LOCAL	143	133	128	128	129
FW ENT #3 HTR TEMP	C	(7)	184	184	180	180	180
STM TO #3 HTR TEMP	F	(10)	548	549	528	530	531
STM TO #3 HTR PRESS	PSIG	LOCAL	370	350	330	330	340
#3 HTR DRAIN TEMP	C	(8)	189	190	185	185	185

JOB NUMBER: RB-502

CUSTOMER: PUBLIC SERVICE OF COLORADO
PUEBLO COLORADO

BY: SVT.

	DATA ITEM	UNITS		2	———	———	———	—▷
	Test No.							
	Date							
	Time	Hours						
	AIR & GAS TEMPERATURES		COMPUTER (POINTS)					
④	Flue Gas Lvg Econ	F	(24/25)	562/569	565/572	550/557	551/557	549/556
③	Flue Gas Lvg AH	F	(20/21)	266/268	266/270	261/273	260/272	258/271
④	Flue Gas Lvg Hot Precip	F	(26/27)	540/545	537/541	533/537	529/534	523/529
③	Flue Gas Lvg Pri AH	F	—					
	Air Lvg FD Fan	F	(12/13)	82.5/82.9	82.5/83.0	82.6/83.1	82.5/82.9	81.5/81.9
⑤	Air Ent Sec AH	F	(14/15)	129/136	128/135	130/138	131/138	130/137
⑥	Air Lvg Sec AH	F	(22/23)	508/502	506/498	502/500	498/500	493/494
	Air Lvg PA Fan	F	—					
⑤	Air Ent Pri AH	F	—					
⑥	Air Lvg Pri AH	F	—					
	Air Ent Pulv	F	—					
①	Ambient Air	F	[18(I)]	63.1	63.0	62.7	62.5	59.5
	MISCELLANEOUS							
	Feedwater Flow	LB/HR	(702)	1462.7	1499.0	1273.9	1334.2	1374.2
	SH Spray Flow	LB/HR	(704)	—	—	—	-	—
	RH Spray Flow	LB/HR	(703)	—	—	—	-	—
	SH Spray Valve Posit	%						
	RH Spray Valve Posit	%						
	*HP Extraction Flow	LB/HR						
⑨	O_2 Lvg Econ	%	(306/307)	2.92/3.1	3.01/2.81	2.93/2.99	2.96/2.98	2.92/3.19
⑧	CO_2 Lvg Econ	%						
	NOx (if avail)							
⑨	O_2 Lvg AH	%						
⑧	CO_2 Lvg AH	%						
	O_2 Lvg Hot Precip	%						
	CO_2 Lvg Hot Precip	%						
	O_2 in Windbox	%						
	CO_2 in Windbox	%						
	NOx or CFA Port Posit							
	+ Fuel Analysis							
	Burner # Out Serv							
㉒	Relative Humidity	%						

Advise location of flow nozzle with respect to SH and RH spray take-off.

* - Any high pressure steam extraction upstream of reheater, excluding FW heaters.

+ - Report data available - specific requirements will be requested.

② - Efficiency data

DATA ITEM	UNITS						
Test No.							
Date							
Time	Hours						
DRAFT LOSS DATA							
FD Fan Disch	" Wg						
SCAH In (Out)	" Wg						
AH Air In	" Wg						
AH Air Out	" Wg						
Windbox	" Wg						
Furnace	" Wg						
Econ Out	" Wg						
AH Gas In	" Wg						
AH Gas Out	" Wg						
Precip In	" Wg						
Precip Out	" Wg						
ID Fan In	" Wg						
SH Outlet Leg TC's	F						
RH Outlet Leg TC's	F						
PULVERIZER DATA							
Pulverizer #							
㉓ * Coal Flow	MLB/HR	813	139.04	138.92	138.38	137.97	137.17
* Pri Air Flow	MLB/HR						
* Sec Air Flow	MBL/HR						
Pulv Amps	AMPS						
Pulv Diff	" Wg						
PA Inlet Temp	F						
Pulv Out Temp	F						
PA Flow Damp	%						
PA Temp Cont Damp	%						
Pri Air Fan Amps	AMPS						
MILL A COAL/AIR TEMP	F	OFF	LINE	——————→			
B COAL/AIR TEMP	F		117	116	118	118	117
C COAL/AIR TEMP	F		122	121	122	122	122
D COAL/AIR TEMP	F		124	124	125	125	124
E COAL/AIR TEMP	F		—	—	—	—	—

The DRAFT LOSS DATA listed on this page is of value, but not absolutely essential for performance analysis.

* - When indicator scale is in different units, provide conversion factor.

② Efficiency data

PLANT OPERATING DATA

DATA ITEM		UNITS						
Test No.			2	2	2	2	2	2
Date			12/8/84	→				
Time		Hours	0900	0930	1000	1030	1100	1130
UNIT ON LOAD DEMAND				NOTE ①			NOTE②	
INSTANT. GROSS MW			238.05	252.17	232.33	266.60	285.72	263.53
BOILER TEMPERATURES								
~~Water to Econ~~	509	F	443.5	445.2	441.5	454.1	459.2	453.1
Water Lvg Econ	311	F	526.9	536	533.3	532.6	536.5	534.7
Stm Lvg Pri SH	514 / 515	F	740.9/738.8	753.5/751	744.9/736.9	738.3/731.2	737.6/732.4	746.4/739.6
Stm Ent Plat SH	—	F						
Stm Lvg Plat SH	—	F						
Stm Ent Sec SH	7 / 8	F	742/739.8	746.8/745.2	728.9/731.3	743.3/742.9	750.6/748.1	746/739
Stm Lvg Sec SH	9	F	1006.7	1013.7	991.8	1017.9	997	979.8
Stm to RH Attemp	11	F	599.4	596.8	576.0	613.3	605.9	576
Stm Lvg RH Attemp	511	F	540.7	552.8	549.7	464.6	535.7	557.3
Stm Lvg RH	602	F	983.4	1000.6	980.9	935.4	961.1	970.5
Water to SH Attemp	507	F	252.5	252.4	253.8	257.8	261.5	258.9
Water to RH Attemp	507	F	252.5	252.4	253.8	257.8	261.5	258.9
BOILER PRESSURES								
Water to Econ	605	PSIG	2638.4	2642.4	2658.4	2648.4	2682.5	2664.5
Drum Press	606	PSIG	2484.4	2494.1	2508.6	2474.7	2516.7	2505.4
PSH in Press	—	PSIG	—	—	—	—	—	—
Stm Lvg Sec SH	601	PSIG	2395.8	2402.1	2419.8	2382.3	2393.7	2393.7
RH Inlet	604	PSIG	386.1	392.7	378.5	437.1	464	428.8
RH Outlet	603	PSIG	331.7	338.6	323.7	385.2	413.4	376.5
HIGH PRESS FW HEATERS								
FW Lvg #1 Htr		F						
FW Ent #1 Htr	3	~~F~~ C	124.6	123.9	123.8	126.1	128.2	127.2
FW Ent #2 Htr	5	~~F~~ C	145.5	145.4	144.1	148.3	150.4	148.4
#1 Htr Drain	4	~~F~~ C	129.9	129.3	128.9	132	134.3	132.8
#2 Htr Drain	6	~~F~~ C	154.2	154.8	152.2	157.8	160.9	157.6
Stm to #1 Htr - Temp	1	F	589.6	588.3	575.7	603.9	586.7	574.4
Stm to #1 Htr - Press	LOCAL	PSIG	60	62	57	67	74	67
Stm to #2 Htr - Temp	2	F	785	784	768.6	801.3	784.1	766.9
Stm to #2 Htr - Press	LOCAL	PSIG	146	154	140	164	178	162
FW ENT #3 HP HTR TEMP	7	C	185.8	186.6	183.8	189.7	192.0	188.9
STM TO #3 HP HTR TEMP	10	F	552.4	558.9	561.4	517.4	526.3	564.6
STM TO #3 HP HTR PRESS	LOCAL	PSIG	380	400	360	430	460	420
#3 HP HTR DRAIN TEMP	8	C	191.5	192.4	186.4	195.9	198.9	195.2

NOTE ① : OVERFIRING PORTS DAMPERS CLOSED @ 0910 HRS.

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO.
JOB NO. : RB-502

NOTE ②: BROUGHT 2-A PULV. ON LINE @ 11:10 HRS.

PLANT OPERATING DATA

DATA ITEM		UNITS						
Test No.			2	2	2	2	2	2
Date			12/8/84	→				
Time		Hours	0900	0930	1000	1030	1100	1130
AIR & GAS TEMPERATURES								
④ Flue Gas Lvg Econ	24/25	F	578.2/582.6	570.8/574.5	563.8/559.1	585.1/587.[illegible]	602.2/606.3	587.4/591.9
③ Flue Gas Lvg AH	20/21	F	253.3/250.2	254.7/251.8	252/252.7	253.8/250.0	255.5/251.4	254.4/251.5
④ Flue Gas Lvg Hot Precip	26/27	F	540.2/540.7	539.4/537.7	536.9/538.5	539.8/540.2	550.7/551.1	552/554.8
③ Flue Gas Lvg Pri AH	—	F	—	—	—	—		
Air Lvg FD Fan	12/13	F	57.1/58.1	57.5/57.8	58.7/58.7	56.7/57.1	56.7/56.6	56.2/56.9
⑤ Air Ent Sec AH	14/15	F	111.4/115.2	109.8/111.3	112.7/118.4	108.6/113	107.5/108.4	106.5/110.8
⑥ Air Lvg Sec AH	22/23	F	503.1/494.5	502.3/493.7	501.8/454.1	500.6/492.5	508/498.2	512.4/502.6
Air Lvg PA Fan	—	F						
⑤ Air Ent Pri AH	—	F						
⑥ Air Lvg Pri AH	—	F						
Air Ent Pulv	—	F						
① Ambient Air	18	F	39.8	40.2	42.8	41.5	41.8	41.8
MISCELLANEOUS								
Feedwater Flow	702	LB/HR	1443.5	1400.2	1355.8	1616.1	1741.1	1620.8
SH Spray Flow	704	LB/HR	—	—	—	—	—	—
RH Spray Flow	703	LB/HR	17.04	17.04	17.05	47.57	23.82	—
SH Spray Valve Posit	—	%						
RH Spray Valve Posit	—	%						
*HP Extraction Flow	—	LB/HR						
⑨ O_2 Lvg Econ	306/307	%	3.18/3.02	3.12/3.11	3.16/2.73	3.26/3.10	3.15/3.10	3.08/3.02
⑧ CO_2 Lvg Econ		%						
NOx (if avail)								
⑨ O_2 Lvg AH		%						
⑧ CO_2 Lvg AH		%						
O_2 Lvg Hot Precip		%						
CO_2 Lvg Hot Precip		%						
O_2 in Windbox		%						
CO_2 in Windbox		%						
NOx or CFA Port Posit								
+ Fuel Analysis								
Burner # Out Serv								
㉒ Relative Humidity		%						

Advise location of flow nozzle with respect to SH and RH spray take-off.

* - Any high pressure steam extraction upstream of reheater, excluding FW heaters.

+ - Report data available - specific requirements will be requested.

② - Efficiency data

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO

PLANT OPERATING DATA

DATA ITEM	UNITS						
Test No.							
Date		12/8/84	→				
Time	Hours	0900	0930	1000	1030	1100	1130
DRAFT LOSS DATA							
~~FD Fan Disch~~	~~" Wg~~						
~~SCAH In (Out)~~	~~" Wg~~						
AH Air In	" Wg						
AH Air Out	" Wg						
Windbox	" Wg						
Furnace	" Wg						
Econ Out	" Wg						
AH Gas In	" Wg						
AH Gas Out	" Wg						
Precip In	" Wg						
Precip Out	" Wg						
ID Fan In	" Wg						
SH Outlet Leg TC's	F						
RH Outlet Leg TC's	F						
PULVERIZER DATA							
Pulverizer #							
㉓ * Coal Flow 813	MLB/HR	128.73	128.70	128.77	128.99	129.86	130.07
* Pri Air Flow	MLB/HR						
* Sec Air Flow	MBL/HR						
Pulv Amps	AMPS						
Pulv Diff	" Wg						
PA Inlet Temp	F						
Pulv Out Temp	F						
PA Flow Damp	%						
PA Temp Cont Damp	%						
Pri Air Fan Amps	AMPS						
PULV 2-A COAL/AIR TEMP	F	OFF LINE →					119.7
PULV 2-B COAL/AIR TEMP	F	115.5	115.2	116.6	115	118.4	125.5
PULV 2-C COAL/AIR TEMP	F	121.1	120.9	121.8	121.1	121.0	123.4
PULV 2-D COAL/AIR TEMP	F	122.7	122.3	123.0	122.8	122.6	125.7

The DRAFT LOSS DATA listed on this page is of value, but not absolutely essential for performance analysis.
* - When indicator scale is in different units, provide conversion factor.
② - Efficiency data

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CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO, COLORADO
[illegible]

PLANT OPERATING DATA

DATA ITEM		UNITS	2					
Test No.								
Date			12/8/84					
Time		Hours	1300	1330	1400	1430	1500	1530
INSTANT. GROSS MW			268.79	253.25	259.30	267.65	264.66	253.75
BOILER TEMPERATURES								
Water to Econ	509	F	452.6	449.1	460.8	454.4	455.9	453.3
Water Lvg Econ	311	F	540	531.9	542.8	542.2	540.9	535.4
Stm Lvg Pri SH	514 / 515	F	746.4/737.9	746.2/734.4	761.7/751.4	752.6/743.6	754.4/740.7	746.5/740.3
Stm Ent Plat SH	—	F	—	—	—	—	—	—
Stm Lvg Plat SH	—	F	—	—	—	—	—	—
Stm Ent Sec SH	7 / 8	F	751.4/738.2	745/733.6	741.1/735.4	752.1/741.9	741.2/734.6	738.9/737.6
Stm Lvg Sec SH	9	F	1007.8	999.6	1000.2	1010.0	1012.2	1005.6
Stm to RH Attemp	11	F	605.8	523.6	589.9	605.7	605.4	592.1
Stm Lvg RH Attemp	511	F	521.3	573.5	557.8	540.8	541.0	534.2
Stm Lvg RH	602	F	982.1	1007.5	1010.7	983.1	984.6	967.4
Water to SH Attemp	507	F	259.2	255.4	258.7	259.8	259.1	256.7
Water to RH Attemp	507	F	259.2	255.4	258.7	259.8	259.1	256.7
BOILER PRESSURES								
Water to Econ	605	PSIG	2680.5	2656.4	2668.5	2664.5	2664.5	2658.4
Drum Press	606	PSIG	2519.9	2502.2	2507.0	2513.5	2500.5	2490.8
PSH in Press	—	PSIG	—	—	—	—	—	—
Stm Lvg Sec SH	601	PSIG	2415.6	2399.0	2385.4	2404.2	2379.0	2391.7
RH Inlet	604	PSIG	421.6	400.5	464.0	427.7	435.9	421.7
RH Outlet	603	PSIG	367.9	346.8	413.4	376.4	383.9	369.0
HIGH PRESS FW HEATERS								
FW Lvg #1 Htr		F	—	—	—	—		
FW Ent #1 Htr	3	~~F~~ C	126.3	125.4	125.3	128.2	126.9	125.7
FW Ent #2 Htr	5	~~F~~ C	148.6	146.5	147.0	149.7	148.6	147.0
#1 Htr Drain	4	~~F~~ C	132.3	130.9	130.7	133.8	132.5	131.1
#2 Htr Drain	6	~~F~~ C	159.9	155.6	156.1	158.7	157.7	156.1
Stm to #1 Htr - Temp	1	F	595.9	579.1	598.0	601.2	583.8	572.6
Stm to #1 Htr - Press	LOCAL	PSIG	68	63	68	69	68	64
Stm to #2 Htr - Temp	2	F	796.3	772.0	794.3	795.0	777.1	763.1
Stm to #2 Htr - Press	LOCAL	PSIG	166	154	166	166	166	154
FW ENT #3 HP HTR TEMP	7	C	190.6	186.9	188.2	190.3	189.4	187.6
STM TO #3 HP HTR TEMP	10	F	542.5	572.6	507.5	538.0	545.4	526.4
STM TO #3 HP HTR PRESS	LOCAL	PSIG	420	400	430	420	420	400
#3 HP HTR DRAIN TEMP	8	C	196.9	192.9	193.8	196.6	195.5	193.6

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO.
JOB NO. : RB-502

PLANT OPERATING DATA

DATA ITEM		UNITS	2	→				→
Test No.								
Date			12/8/84	→				→
Time		Hours	1300	1330	1400	1430	1500	1530
AIR & GAS TEMPERATURES								
④ Flue Gas Lvg Econ	24/25	F	590.2/595.9	582.8/590.9	582.9/588.2	589.9/597.2	586.6/592.9	582.8/588.9
③ Flue Gas Lvg AH	20/21	F	254.8/252.5	255.9/254.2	256.6/253.8	258.8/253.1	259.1/256.2	263.0/260.6
④ Flue Gas Lvg Hot Precip	26/27	F	546.9/548.6	548.5/551.3	549.8/550.2	553.2/554.8	553.5/555.9	551.8/554.6
③ Flue Gas Lvg Pri AH	—	F	—	—	—	—	—	—
Air Lvg FD Fan	12/13	F	61.9/62.3	61.3/61.9	62.2/62.4	62.1/62.6	66.0/66.5	73.4/73.9
⑤ Air Ent Sec AH	14/15	F	109/113.6	110.3/116.1	111.9/118.1	108.4/113.8	111.4/116.6	118.1/124.5
⑤ Air Lvg Sec AH	22/23	F	506.1/499.2	510.1/502.4	511.9/503.7	511.9/505.0	513.6/506.7	514.6/506.1
Air Lvg PA Fan	—	F						
⑤ Air Ent Pri AH	—	F						
⑥ Air Lvg Pri AH	—	F						
Air Ent Pulv	—	F						
① Ambient Air	18	F	49.4	48.9	47.2	45.8	48.9	59.3
MISCELLANEOUS								
Feedwater Flow	702	LB/HR	1542.3	1512.4	1716.7	1637.4	1592.9	1585.9
SH Spray Flow	704	LB/HR	—	—	—	—	9.95	—
RH Spray Flow	703	LB/HR	36.44	—	38.03	33.97	29.9	30.11
SH Spray Valve Posit	—	%	—	—	—	—	—	—
RH Spray Valve Posit	—	%	—	—	—	—	—	—
* HP Extraction Flow	—	LB/HR	—	—	—	—	—	—
⑨ O_2 Lvg Econ	306/307	%	3.19/2.93	3.13/2.80	3.21/2.96	3.24/2.98	3.24/2.75	3.01/3.00
⑧ CO_2 Lvg Econ		%						
NOx (if avail)								
⑨ O_2 Lvg AH		%						
⑧ CO_2 Lvg AH		%						
O_2 Lvg Hot Precip		%						
CO_2 Lvg Hot Precip		%						
O_2 in Windbox		%						
CO_2 in Windbox		%						
NOx or CFA Port Posit								
+ Fuel Analysis								
Burner # Out Serv								
㉒ Relative Humidity		%						

Advise location of flow nozzle with respect to SH and RH spray take-off.

* - Any high pressure steam extraction upstream of reheater, excluding FW heaters.

+ - Report data available - specific requirements will be requested.

② - Efficiency data

2

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO
JOB NUMBER : [illegible]

PLANT OPERATING DATA

DATA ITEM	UNITS	2	2	2	2	2	2
Test No.							
Date		12-8-84					
Time	Hours	1300	1330	1400	1430	1500	1530
DRAFT LOSS DATA							
~~FD Fan Disch~~	~~" Wg~~						
~~SCAH In (Out)~~	~~" Wg~~						
AH Air In	" Wg						
AH Air Out	" Wg						
Windbox	" Wg						
Furnace	" Wg						
Econ Out	" Wg						
AH Gas In	" Wg						
AH Gas Out	" Wg						
Precip In	" Wg						
Precip Out	" Wg						
ID Fan In	" Wg						
SH Outlet Leg TC's	F						
RH Outlet Leg TC's	F						
PULVERIZER DATA							
Pulverizer #							
㉓ * Coal Flow 813	MLB/HR	130.72	130.76	131.01	131.31	131.51	131.53
* Pri Air Flow	MLB/HR						
* Sec Air Flow	MBL/HR						
Pulv Amps	AMPS						
Pulv Diff	" Wg						
PA Inlet Temp	F						
Pulv Out Temp	F						
PA Flow Damp	%						
PA Temp Cont Damp	%						
Pri Air Fan Amps	AMPS						
PULV 2A COAL/AIR TEMP	F	125.2	126.0	127.6	127.2	127.2	128.2
PULV 2B COAL/AIR TEMP	F	126.8	129.0	129.2	128.5	128.0	129.1
PULV. 2C COAL/AIR TEMP	F	123.4	123.9	124.7	124.2	124.2	124.8
PULV. 2D COAL/AIR TEMP	F	128.6	126.4	127.4	127.0	126.9	127.5

The DRAFT LOSS DATA listed on this page is of value, but not absolutely essential for performance analysis.

* - When indicator scale is in different units, provide conversion factor.

② Efficiency data

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO, COLORADO

JOB NUMBER [illegible]

PLANT OPERATING DATA

DATA ITEM		UNITS	2	2				
Test No.								
Date			12/8/84	12/8/84				
Time		Hours	1600	1630				
INSTANT GROSS MW			252.10	274.78				
UNIT ON LOAD DEMAND								
BOILER TEMPERATURES								
~~Water to Econ~~	509	F	449.9	462.7				
Water Lvg Econ	311	F	536.9	554.4				
Stm Lvg Pri SH	514 / 515	F	753.7/744.2	769.6/757.4				
Stm Ent Plat SH	—	F	—	—				
Stm Lvg Plat SH	—	F	—	—				
Stm Ent Sec SH	7 / 8	F	741/736.5	748.3/740.1				
Stm Lvg Sec SH	9	F	1004.1	999.2				
Stm to RH Attemp	11	F	591	603.2				
Stm Lvg RH Attemp	511	F	525.4	563.8				
Stm Lvg RH	602	F	975.2	1003.4				
Water to SH Attemp	507	F	255.8	261.4				
Water to RH Attemp	507	F	255.8	261.4				
BOILER PRESSURES								
Water to Econ	605	PSIG	2656.4	2682.5				
Drum Press	606	PSIG	2495.7	2518.3				
PSH in Press	—	PSIG	—	—				
Stm Lvg Sec SH	601	PSIG	2397.9	2396.9				
RH Inlet	604	PSIG	407.5	464.1				
RH Outlet	603	PSIG	354.1	413.6				
HIGH PRESS FW HEATERS								
FW Lvg #1 Htr		F						
FW Ent #1 Htr	3	~~F~~ C	125.7	127.6				
FW Ent #2 Htr	5	~~F~~ C	147	150.0				
#1 Htr Drain	4	~~F~~ C	131.1	133.4				
#2 Htr Drain	6	~~F~~ C	155.8	159.7				
Stm to #1 Htr - Temp	1	F	576.7	592.6				
Stm to #1 Htr - Press	LOCAL	PSIG	64	75				
Stm to #2 Htr - Temp	2	F	770.5	789.7				
Stm to #2 Htr - Press	LOCAL	PSIG	154	178				
FW ENT #3 HP HTR TEMP	7	C	187.3	191.3				
STM TO #3 HP HTR TEMP	10	F	524.1	546.9				
STM TO #3 HP HTR PRESS	LOCAL	PSIG	400	450				
#3 HP HTR DRAIN TEMP	8	C	193.1	197.9				

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO.
JOB NO. : RB-502

1

PLANT OPERATING DATA

DATA ITEM	UNITS						
Test No.							
Date							
Time	Hours						
AIR & GAS TEMPERATURES							
④ Flue Gas Lvg Econ 24/25	F	583.2/588.1	590.9/588.6				
③ Flue Gas Lvg AH 20/21	F	262.7/261.9	261.6/259				
④ Flue Gas Lvg Hot Precip 26/27	F	551.9/553.5	5505/551.3				
③ Flue Gas Lvg Pri AH —	F	—	—				
Air Lvg FD Fan 12/13	F	75.3/75.6	71.4/71.4				
⑤ Air Ent Sec AH 14/15	F	119.7/125.7	115.3/119.5				
⑥ Air Lvg Sec AH 22/23	F	511.8/506.1	5093/504				
Air Lvg PA Fan —	F	—	—				
⑤ Air Ent Pri AH —	F	—	—				
⑥ Air Lvg Pri AH —	F	—	—				
Air Ent Pulv —	F	—	—				
① Ambient Air 18	F	61.2	53.1				
MISCELLANEOUS							
Feedwater Flow 702	LB/HR	1512.7	1806.7				
SH Spray Flow 704	LB/HR	3.62	44.91				
RH Spray Flow 703	LB/HR	30.43	29.55				
SH Spray Valve Posit —	%	—					
RH Spray Valve Posit —	%	—					
* HP Extraction Flow —	LB/HR	—					
⑨ O_2 Lvg Econ 306/307	%	3.19/2.98	3.0/2.92				
⑧ CO_2 Lvg Econ	%						
NOx (if avail)							
⑨ O_2 Lvg AH	%						
⑧ CO_2 Lvg AH	%						
O_2 Lvg Hot Precip	%						
CO_2 Lvg Hot Precip	%						
O_2 in Windbox	%						
CO_2 in Windbox	%						
NOx or CFA Port Posit							
+ Fuel Analysis							
Burner # Out Serv							
㉒ Relative Humidity	%						

Advise location of flow nozzle with respect to SH and RH spray take-off.

* - Any high pressure steam extraction upstream of reheater, excluding FW heaters.

+ - Report data available - specific requirements will be requested.

② - Efficiency data

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO

PLANT OPERATING DATA

DATA ITEM	UNITS						
Test No.							
Date							
Time	Hours						
DRAFT LOSS DATA							
~~FD Fan Disch~~	" Wg						
~~SCAH In (Out)~~	" Wg						
AH Air In	" Wg						
AH Air Out	" Wg						
Windbox	" Wg						
Furnace	" Wg						
Econ Out	" Wg						
AH Gas In	" Wg						
AH Gas Out	" Wg						
Precip In	" Wg						
Precip Out	" Wg						
ID Fan In	" Wg						
SH Outlet Leg TC's	F						
RH Outlet Leg TC's	F						
PULVERIZER DATA							
Pulverizer #							
㉓ * Coal Flow 813	MLB/HR	131.54	131.91				
* Pri Air Flow	MLB/HR						
* Sec Air Flow	MBL/HR						
Pulv Amps	AMPS						
Pulv Diff	" Wg						
PA Inlet Temp	F						
Pulv Out Temp	F						
PA Flow Damp	%						
PA Temp Cont Damp	%						
Pri Air Fan Amps	AMPS						
PULV 2-A COAL/AIR TEMP	F	128.2	127.3				
2-B	F	129.1	127.7				
2-C	F	124.6	124.0				
2-D	F	127.5	127.0				

The DRAFT LOSS DATA listed on this page is of value, but not absolutely essential for performance analysis.

* - When indicator scale is in different units, provide conversion factor.

② Efficiency data

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO, COLORADO

JOB NUMBER RB-507

PLANT OPERATING DATA

DATA ITEM	UNITS	2					→
Test No.							
Date		12/10/84					→
Time	Hours	0800	0830	0900	0930	1000	1030
INSTANT. GEN. GROSS MW		336.63	334.45	336.05	360.35	344.51	328.64
BOILER TEMPERATURES							
~~Water to Econ~~ 509	~~F~~	477.7	478.6	484.5	485	476.7	478.6
Water Lvg Econ 311	F	563.8	563	571.4	574.2	563.3	565.7
Stm Lvg Pri SH 514/515	F	765.6/753.4	770.8/763.6	773.6/765.7	773/767.0	760.2/754.1	762/757.8
Stm Ent Plat SH —	F		—	—	—	—	—
Stm Lvg Plat SH —	F		—	—	—	—	—
Stm Ent Sec SH 7/8	F	764.1/755.1	761.1/752.4	760.7/755.8	772.1/756.9	760.5/767.7	760.7/755.[illegible]
Stm Lvg Sec SH 9	F	998.3	1005.6	1003.0	995.7	1001.6	1011.7
Stm to RH Attemp 11	F	629.8	632.9	633.4	638.2	634.1	634.1
Stm Lvg RH Attemp 511	F	569.7	578.9	579.8	572.8	575.6	567.2
Stm Lvg RH 602	F	1001.9	1021.6	1015.7	1011.9	987.5	1015.4
Water to SH Attemp 507	F	272.8	272.8	274.8	277	273.1	272.6
Water to RH Attemp 507	F	272.8	272.8	274.8	277	273.1	272.6
BOILER PRESSURES							
Water to Econ 605	PSIG	2742.8	2738.7	2750.8	2750.8	2744.8	2736.7
Drum Press 606	PSIG	2568.4	2565.2	2560.3	2578.1	2558.7	2549.0
PSH in Press —	PSIG	—	—	—	—	—	—
Stm Lvg Sec SH 601	PSIG	2403.1	2399	2386.5	2401	2399	2393.7
RH Inlet 604	PSIG	549.2	554.8	591.6	598.8	542.2	549
RH Outlet 603	PSIG	502.9	508.8	547.4	555	495.6	502.7
HIGH PRESS FW HEATERS							
FW Lvg #1 Htr	F						
FW Ent #1 Htr 3	~~F~~ C	134.9	134.3	134.5	137.1	136.7	134.3
FW Ent #2 Htr 5	~~F~~ C	156.6	155.9	156.2	159.5	158.9	156.6
#1 Htr Drain 4	~~F~~ C	142.0	141.1	141.3	144.5	143.3	140.9
#2 Htr Drain 6	~~F~~ C	168.7	168.2	169.6	171.8	169.9	167.6
Stm to #1 Htr - Temp 1	F	600.0	595.9	601.6	608.1	596.3	590.7
Stm to #1 Htr - Press LOCAL	PSIG	90	88	91	97	89	87
Stm to #2 Htr - Temp 2	F	797.6	791.3	797.5	803.5	791.7	786.5
Stm to #2 Htr - Press LOCAL	PSIG	210	210	214	228	208	208
FW ENT #3 HP HTR TEMP 7	C	199.4	198.7	199.7	202	200.4	199.3
STM TO #3 HP HTR TEMP 10	F	567.4	579.1	568.1	575.0	565.6	568.3
STM TO #3 HP HTR PRESS LOCAL	PSIG	530	530	540	570	530	520
#3 HP HTR DRAIN TEMP 8	C	207.7	207.1	207.5	211.1	208.9	206.3

UNIT RUNS WITH OVERFIRE DAMPER OPEN @ 18%(R) AND 10%(L) UNTIL DAMPERS CLOSED @ 0935 HRS

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO.
JOB NO. : RB-502

1

PLANT OPERATING DATA

DATA ITEM		UNITS	2	→				→
Test No.								
Date			12/10/84	→				
Time		Hours	0800	0830	0900	0930	1000	1030
AIR & GAS TEMPERATURES								
④ ~~Flue Gas Lvg Econ~~	24/25	F	653.0/653.9	649.2/651.7	642.9/643.7	666.9/666.9	663.9/666.0	648.5/651.8
③ Flue Gas Lvg AH	20/21	F	254.9/264.5	260.6/267.5	260.6/268.9	261.8/268.6	264.3/272.3	267.1/275.8
④ Flue Gas Lvg Hot Precip	26/27	F	594.6/594.5	558.6/600.7	597.2/600.8	608.5/609.3	616.6/617.8	609/611
③ Flue Gas Lvg Pri AH	—	F	—	—	—	—	—	
Air Lvg FD Fan	12/13	F	43.0/44.6	44.9/46.3	46.4/47.1	46.4/47.4	49/49.7	52.7/52.9
⑤ Air Ent Sec AH	14/15	F	101.3/97.6	95.1/95.8	93.2/96.1	91.1/93.6	88.8/96.4	93.9/100.5
⑥ Air Lvg Sec AH	22/23	F	539.1/532.6	544.8/539.5	547/541.3	551/545.3	559.5/554.2	557.2/551.1
Air Lvg PA Fan	—	F						
⑤ Air Ent Pri AH	—	F						
⑥ Air Lvg Pri AH	—	F						
Air Ent Pulv	—	F						
① Ambient Air	18	F	29.9	32.6	32.7	33.9	35.6	39.5
MISCELLANEOUS								
Feedwater Flow	702	LB/HR	2122.3	2057.6	2212.8	2279.8	2101.3	2099.1
SH Spray Flow	704	LB/HR	—	—	—	—	—	—
RH Spray Flow	703	LB/HR	44.23	50.06	48.94	53.32	36.96	52.32
SH Spray Valve Posit	—	%						
RH Spray Valve Posit	—	%						
*HP Extraction Flow	—	LB/HR						
⑨ O_2 Lvg Econ	306/307	%	3.12/2.81	3.11/2.70	3.0/2.76	2.88/2.86	2.92/2.65	2.98/2.78
⑧ CO_2 Lvg Econ		%						
NOx (if avail)								
⑨ O_2 Lvg AH		%						
⑧ CO_2 Lvg AH		%						
O_2 Lvg Hot Precip		%						
CO_2 Lvg Hot Precip		%						
O_2 in Windbox		%						
CO_2 in Windbox		%						
NOx or CFA Port Posit								
+ Fuel Analysis								
Burner # Out Serv								
㉒ Relative Humidity		%						

Advise location of flow nozzle with respect to SH and RH spray take-off.

* - Any high pressure steam extraction upstream of reheater, excluding FW heaters.

+ - Report data available - specific requirements will be requested.

② - Efficiency data

2

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO

JOB NUMBER -

PLANT OPERATING DATA

DATA ITEM	UNITS						
Test No.							
Date							
Time	Hours	0800	0830	0900	0930	1000	1030
DRAFT LOSS DATA							
~~FD Fan Disch~~	~~" Wg~~						
~~SCAH In (Out)~~	~~" Wg~~						
AH Air In	" Wg						
AH Air Out	" Wg						
Windbox	" Wg						
Furnace	" Wg						
Econ Out	" Wg						
AH Gas In	" Wg						
AH Gas Out	" Wg						
Precip In	" Wg						
Precip Out	" Wg						
ID Fan In	" Wg						
SH Outlet Leg TC's	F						
RH Outlet Leg TC's	F						
PULVERIZER DATA							
Pulverizer #							
㉓ * Coal Flow 813	MLB/HR	135.94	138.28	140.51	143.07	144.89	146.27
* Pri Air Flow	MLB/HR						
* Sec Air Flow	MBL/HR						
Pulv Amps	AMPS						
Pulv Diff	" Wg						
PA Inlet Temp	F						
Pulv Out Temp	F						
PA Flow Damp	%						
PA Temp Cont Damp	%						
Pri Air Fan Amps	AMPS						
PULV 2-A COAL/AIR TEMP 16	F	125.9	127.2	127.3	126.8	127.7	128.1
PULV 2-B COAL/AIR TEMP 17	F	123.3	124.2	124.7	124.2	125.7	125.8
PULV 2-C COAL/AIR TEMP 18	F	120.8	121.4	121.9	121.6	122.5	122.7
PULV 2-D COAL/AIR TEMP 19	F	123.9	124.4	124.7	124.6	125.7	126.0

The DRAFT LOSS DATA listed on this page is of value, but not absolutely essential for performance analysis.

* - When indicator scale is in different units, provide conversion factor.

② - Efficiency data

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO, COLORADO

JOB NUMBER RB-507

PLANT OPERATING DATA

DATA ITEM	UNITS	2	→				→
Test No.							
Date		12/10/84	→				→
Time	Hours	1100	1130	1300	1330	1400	1430
INSTANT GEN. GROSS	MW	332.65	315.38	301.07	296.45	280.70	269.15
UNIT ON LOAD DEMAND						NOTE ①	
BOILER TEMPERATURES							
~~Water to Econ~~ 509	~~F~~	476.7	470.7	460.2	462.9	461.5	459.6
Water Lvg Econ 311	F	566.4	535.7	545.4	546.7	541.1	543.3
Stm Lvg Pri SH 514/515	F	767.8/760.9	755.2/747.6	745.1/738.8	750.6/742.4	745.4/738.1	753.6/750.9
Stm Ent Plat SH —	F	—	—	—	—		—
Stm Lvg Plat SH —	F	—	—	—	—		—
Stm Ent Sec SH 7/8	F	767.4/760.1	756/750.3	752.6/745.6	751.3/743.5	744.5/738.7	737.3/735.7
Stm Lvg Sec SH 9	F	1012.2	974.6	981.9	959.8	973.5	974.9
Stm to RH Attemp 11	F	640.7	604.0	607.2	591.6	586.1	580.3
Stm Lvg RH Attemp 511	F	558.9	551.4	516.2	577.5	514.9	590.9
Stm Lvg RH 602	F	1007.2	977.1	967.7	984.3	960.8	1010.3
Water to SH Attemp 507	F	272.4	269.8	264.5	263.7	262.4	260.1
Water to RH Attemp 507	F	272.4	269.8	264.5	263.7	262.4	260.1
BOILER PRESSURES							
Water to Econ 605	PSIG	2744.8	2728.7	2710.6	2710.6	2690.6	2702.6
Drum Press 606	PSIG	2555.5	2552.3	2511.9	2537.7	2523.2	2536.1
PSH in Press —	PSIG	—	—	—	—	—	—
Stm Lvg Sec SH 601	PSIG	2406.3	2410.4	2406.3	2403.1	2397.9	2410.4
RH Inlet 604	PSIG	541.8	519	463.8	467.1	463.6	463.6
RH Outlet 603	PSIG	495.1	471.2	413.2	416.7	413.0	413.0
HIGH PRESS FW HEATERS							
FW Lvg #1 Htr	F						
FW Ent #1 Htr 3	~~F~~ C	134.4	133.7	131.9	130.7	129.2	127.5
FW Ent #2 Htr 5	~~F~~ C	156.9	155.6	153.9	153.0	151.1	149.1
#1 Htr Drain 4	~~F~~ C	141.0	140.1	138.1	136.9	135.2	133.3
#2 Htr Drain 6	~~F~~ C	168.1	165.9	163.9	163.3	161.0	158.8
Stm to #1 Htr - Temp 1	F	607.0	589.9	596.2	576.2	581.7	575.7
Stm to #1 Htr - Press LOCAL	PSIG	87	86	74	-76	72	73
Stm to #2 Htr - Temp 2	F	804.0	780.9	788.9	769.2	772.2	769.1
Stm to #2 Htr - Press LOCAL	PSIG	206	204	176	184	172	174
FW ENT #3 HP HTR TEMP 7	C	199.1	196.4	195.0	194.5	191.9	189.9
STM TO #3 HP HTR TEMP 10	F	557.5	550.2	542.2	525.7	575.6	571.3
STM TO #3 HP HTR PRESS LOCAL	PSIG	520	520	460	460	440	450
#3 HP HTR DRAIN TEMP 8	C	207.2	204.1	202.1	201.7	198.8	196.3

NOTE ① PULV. 2-A WAS TAKEN OFF-LINE @ 1410 HRS

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO.
JOB NO. : RB-502

1

PLANT OPERATING DATA

DATA ITEM		UNITS						
Test No.			2					→
Date			12/10/84					→
Time		Hours	1100	1130	1300	1330	1400	1430
AIR & GAS TEMPERATURES								
④ Flue Gas Lvg Econ	24/25	F	649.9/651.3	636.5/639.4	618.4/625.4	615.7/620.2	609.4/612.6	601.9/604.7
③ Flue Gas Lvg AH	20/21	F	266.3/276.3	266.5/275.0	263.2/272.1	265.8/272.4	271.3/277.9	265.5/273.5
④ Flue Gas Lvg Hot Precip	26/27	F	606.9/610.1	602.7/605.1	587.2/589.2	582.3/584.7	580.0/582.9	574.5/577.6
③ Flue Gas Lvg Pri AH	—	F	—	—	—	—	—	—
Air Lvg FD Fan	12/13	F	56.2/56.9	60.0/60.3	66.2/66.4	68.2/69.0	71.4/72.0	74.1/74.9
⑤ Air Ent Sec AH	14/15	F	96.5/103.4	101.5/107.6	107.5/113.7	109.8/116.0	114.7/120.7	117.4/124.5
⑥ Air Lvg Sec AH	22/23	F	555.5/551.4	552.6/548.5	540.3/536.3	536.7/533.4	536.9/535.6	533/528.2
Air Lvg PA Fan	—	F						
⑤ Air Ent Pri AH	—	F						
⑥ Air Lvg Pri AH	—	F						
Air Ent Pulv	—	F						
① Ambient Air	18	F	44.6	45.2	49.4	52.9	55.5	56.7
MISCELLANEOUS								
Feedwater Flow	702	LB/HR	2113.8	2057.3	1797.1	1855.8	1733.9	1754.5
SH Spray Flow	704	LB/HR	—	—	—	—	—	—
RH Spray Flow	703	LB/HR	54.23	37.95	7.95	—	44.15	—
SH Spray Valve Posit	—	%		-	—	—	—	—
RH Spray Valve Posit	—	%		-	-	—	—	—
* HP Extraction Flow	—	LB/HR			—	—	—	—
⑨ O₂ Lvg Econ	306/307	%	3.07/2.76	2.89/2.62	2.99/2.58	3.01/2.64	3.01/2.77	2.84/2.53
⑧ CO₂ Lvg Econ		%						
NOx (if avail)								
⑨ O₂ Lvg AH		%						
⑧ CO₂ Lvg AH		%						
O₂ Lvg Hot Precip		%						
CO₂ Lvg Hot Precip		%						
O₂ in Windbox		%						
CO₂ in Windbox		%						
NOx or CFA Port Posit								
+ Fuel Analysis								
Burner # Out Serv								
㉒ Relative Humidity		%						

Advise location of flow nozzle with respect to SH and RH spray take-off.

* - Any high pressure steam extraction upstream of reheater, excluding FW heaters.

+ - Report data available - specific requirements will be requested.

② - Efficiency data

2

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO
JOB NUMBER - 02-5[illegible]

PLANT OPERATING DATA

DATA ITEM	UNITS	2 →					
Test No.							
Date		12/10/84 →					
Time	Hours	1100	1130	1300	1330	1400	1430
DRAFT LOSS DATA							
~~FD Fan Disch~~	~~" Wg~~						
~~SCAH In (Out)~~	~~" Wg~~						
AH Air In	" Wg						
AH Air Out	" Wg						
Windbox	" Wg						
Furnace	" Wg						
Econ Out	" Wg						
AH Gas In	" Wg						
AH Gas Out	" Wg						
Precip In	" Wg						
Precip Out	" Wg						
ID Fan In	" Wg						
SH Outlet Leg TC's	F						
RH Outlet Leg TC's	F						
PULVERIZER DATA							
Pulverizer #							
㉓ • Coal Flow 813	MLB/HR	147.52	148.29	149.13	149.32	149.33	149.28
• Pri Air Flow	MLB/HR						
• Sec Air Flow	MBL/HR						
Pulv Amps	AMPS						
Pulv Diff	" Wg						
PA Inlet Temp	F						
Pulv Out Temp	F						
PA Flow Damp	%						
PA Temp Cont Damp	%						
Pri Air Fan Amps	AMPS						
PULV 2-A COAL/AIR TEMP	F	129.2	130.8	131.5	131.1	144.7	—
PULV 2-B COAL/AIR TEMP	F	128.3	127.7	127.8	127.0	124.2	124.5
PULV 2-C COAL/AIR TEMP	F	123.0	123.9	123.8	123.4	121.7	121.5
PULV. 2-D COAL/AIR TEMP	F	126.3	127.2	127.1	126.5	124.4	124.6

The DRAFT LOSS DATA listed on this page is of value, but not absolutely essential for performance analysis.

• - When indicator scale is in different units, provide conversion factor.

② Efficiency data

3

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO, COLORADO

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PLANT OPERATING DATA

DATA ITEM	UNITS	2	→		→		
Test No.							
Date		12/10/84	→		→		
Time	Hours	1500	1530	1600	1630		
INSTANT GENERATION GROSS	MW	272.85	261.10	273.13	281.32		
UNIT ON LOAD DEMAND					NOTE ①		
BOILER TEMPERATURES							
~~Water to Econ~~ 509	~~F~~	454.5	453.1	454.3	460.9		
Water Lvg Econ 311	F	530.3	534.5	542.0	543.4		
Stm Lvg Pri SH 514/515	F	735.2/731.5	745.7/741.3	753.3/751.9	752.7/748		
Stm Ent Plat SH —	F	—	—	—	—		
Stm Lvg Plat SH —	F	—	—	—	—		
Stm Ent Sec SH 7/8	F	747.4/738.0	736.4/738.5	743.1/742.6	750.8/748.8		
Stm Lvg Sec SH 9	F	975.5	981.3	995.2	1003.2		
Stm to RH Attemp 11	F	580.9	576.5	592.1	608.0		
Stm Lvg RH Attemp 511	F	559.7	571.9	591.7	536.9		
Stm Lvg RH 602	F	958.0	977.1	1010.7	974.9		
Water to SH Attemp 507	F	257.3	256.2	258.1	261.6		
Water to RH Attemp 507	F	257.3	256.2	258.1	261.6		
BOILER PRESSURES							
Water to Econ 605	PSIG	2688.6	2666.5	2692.6	2692.6		
Drum Press 606	PSIG	2513.5	2510.2	2519.9	2524.8		
PSH in Press —	PSIG	—	—	—	—		
Stm Lvg Sec SH 601	PSIG	2393.7	2394.8	2390.6	2395.8		
RH Inlet 604	PSIG	442.3	428.2	463.5	463.5		
RH Outlet 603	PSIG	390.7	375.9	412.9	412.9		
HIGH PRESS FW HEATERS							
FW Lvg #1 Htr	F	—	—	—	—		
FW Ent #1 Htr 3	~~F~~ C	128.5	126.6	127.2	128.5		
FW Ent #2 Htr 5	~~F~~ C	150.1	147.9	149.2	150.7		
#1 Htr Drain 4	~~F~~ C	134.3	132.3	133.2	134.3		
#2 Htr Drain 6	~~F~~ C	159.6	157.4	159.1	160.4		
Stm to #1 Htr - Temp 1	F	591.5	570.4	586.5	609.2		
Stm to #1 Htr - Press LOCAL	PSIG	70	65	68	74		
Stm to #2 Htr - Temp 2	F	784.1	761.4	780.7	805.1		
Stm to #2 Htr - Press LOCAL	PSIG	170	156	165	174		
FW ENT #3 HP HTR TEMP 7	C	190.9	188.3	190.4	192.1		
STM TO #3 HP HTR TEMP 10	F	572.8	565.9	581.9	533.8		
STM TO #3 HP HTR PRESS LOCAL	PSIG	440	400	430	440		
#3 HP HTR DRAIN TEMP 8	C	197.3	194.7	197.1	198.6		

NOTE ①: overfire ports open at 1415 hrs @ 16% open (R) 14% open (L).

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO.
JOB NO. : RB-502

PLANT OPERATING DATA

DATA ITEM	UNITS	2			→		
Test No.							
Date		12/10/84	12/10/84	12/10/84	12/10/84		
Time	Hours	1500	1530	1600	1630		
AIR & GAS TEMPERATURES							
④ Flue Gas Lvg Econ 24/25	F	607/612.6	596/598.9	605.2/606.8	614.1/615.3		
③ Flue Gas Lvg AH 20/21	F	264.4/273.5	264.3/275.9	265.8/272.5	262.2/270.3		
④ Flue Gas Lvg Hot Precip 26/27	F	574/577.3	569.5/572.4	566.9/568.9	572.6/572.2		
③ Flue Gas Lvg Pri AH —	F	—	—	-	—		
Air Lvg FD Fan 12/13	F	74.5/75.0	75.8/75.2	75.1/74.6	72.5/73.0		
⑤ Air Ent Sec AH 14/15	F	116.8/123.3	118.8/125.4	116.5/122.5	115.3/121.6		
⑥ Air Lvg Sec AH 22/23	F	531.7/528	527.6/526.4	523.7/522.5	527/523.3		
Air Lvg PA Fan —	F						
⑤ Air Ent Pri AH —	F						
⑥ Air Lvg Pri AH —	F						
Air Ent Pulv —	F						
① Ambient Air 18	F	56.5	56.7	55.2	57.9		
MISCELLANEOUS							
Feedwater Flow 702	LB/HR	1713.7	1659.3	1806.1	1741.7		
SH Spray Flow 704	LB/HR	—	—	—	—		
RH Spray Flow 703	LB/HR	—	—	—	39.43		
SH Spray Valve Posit —	%	—	—	—	—		
RH Spray Valve Posit —	%	—	—	—	—		
* HP Extraction Flow —	LB/HR	—	—	—	—		
⑨ O_2 Lvg Econ 306/307	%	2.48/2.49	3.15/2.95	3.15/2.97	2.87/2.71		
⑧ CO_2 Lvg Econ	%						
NOx (if avail)							
⑨ O_2 Lvg AH	%						
⑧ CO_2 Lvg AH	%						
O_2 Lvg Hot Precip	%						
CO_2 Lvg Hot Precip	%						
O_2 in Windbox	%						
CO_2 in Windbox	%						
NOx or CFA Port Posit							
+ Fuel Analysis							
Burner # Out Serv					-		
㉒ Relative Humidity	%						

Advise location of flow nozzle with respect to SH and RH spray take-off.

* - Any high pressure steam extraction upstream of reheater, excluding FW heaters.

+ - Report data available - specific requirements will be requested.

② - Efficiency data

2

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO

JOB NUMBER - [illegible]

PLANT OPERATING DATA

DATA ITEM	UNITS	2	→				
Test No.							
Date		12/10/84	→				
Time	Hours	1500	1530	1600	1630		
DRAFT LOSS DATA							
~~FD Fan Disch~~	~~" Wg~~						
~~SCAH In (Out)~~	~~" Wg~~						
AH Air In	" Wg						
AH Air Out	" Wg						
Windbox	" Wg						
Furnace	" Wg						
Econ Out	" Wg						
AH Gas In	" Wg						
AH Gas Out	" Wg						
Precip In	" Wg						
Precip Out	" Wg						
ID Fan In	" Wg						
SH Outlet Leg TC's	F						
RH Outlet Leg TC's	F						
PULVERIZER DATA							
Pulverizer #							
㉓ * Coal Flow 813	MLB/HR	149.04	148.75	148.67	148.69		
* Pri Air Flow	MLB/HR						
* Sec Air Flow	MBL/HR						
Pulv Amps	AMPS						
Pulv Diff	" Wg						
PA Inlet Temp	F						
Pulv Out Temp	F						
PA Flow Damp	%						
PA Temp Cont Damp	%						
Pri Air Fan Amps	AMPS						
PULV 2-F COAL/AIR TEMP.	F	OFF-LINE	—	—	—		
PULV 2-B " "	F	123.8	123.6	122.7	123.0		
PULV 2-C " "	F	121.0	121.2	120.3	120.4		
PULV 2-D " "	F	124.1	123.9	123.1	123.4		

The DRAFT LOSS DATA listed on this page is of value, but not absolutely essential for performance analysis.

* - When indicator scale is in different units, provide conversion factor.

② - Efficiency data

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO, COLORADO

PLANT OPERATING DATA

DATA ITEM	UNITS	2 →					→
Test No.							
Date		12/11/84 →					→
Time	Hours	0730	0800	0830	0900	0930	1000
BOILER TEMPERATURES							
[redacted]	F	454.7	462.4	451.1	460.0	455.4	458.3
Water Lvg Econ 311	F	539.6	545.4	532.3	538.4	540.5	543.3
Stm Lvg Pri SH 514 / 515	F	742.5/736.3	746.6/741.9	746.7/733.4	756.4/743.4	754.6/746.5	750.2/742.2
Stm Ent Plat SH —	F						
Stm Lvg Plat SH —	F						
Stm Ent Sec SH 7 / 8	F	752.6/746.5	743.3/741.1	744.5/731.8	741.8/736.4	746.5/739.6	760.5/751.1
Stm Lvg Sec SH 9	F	973.8	998.4	980.6	993.9	992.8	1017.7
Stm to RH Attemp 11	F	583.4	596.8	576.1	584.4	590.2	614.0
Stm Lvg RH Attemp 511	F	566.9	530.1	572.3	535.2	513.2	529.1
Stm Lvg RH 602	F	977.7	984.0	994.4	1026.6	1004.1	982.8
Water to SH Attemp 507	F	260.9	262.4	256.6	258.0	259.5	261.3
Water to RH Attemp 507	F	260.9	262.4	256.6	258.0	259.5	261.3
BOILER PRESSURES							
Water to Econ 605	PSIG	2688.6	2692.6	2674.5	2680.5	2676.5	2686.5
Drum Press 606	PSIG	2526.4	2524.9	2513.5	2523.2	2524.8	2537.7
PSH in Press —	PSIG						
Stm Lvg Sec SH 601	PSIG	2410.4	2406.0	2401.0	2394.8	2410.4	2401.0
RH Inlet 604	PSIG	428.3	463.6	414.0	463.6	428.2	449.4
RH Outlet 603	PSIG	376.0	413.0	361.0	413.0	375.9	398.1
HIGH PRESS FW HEATERS							
FW Lvg #1 Htr	F						
FW Ent #1 Htr 3	~~F~~ C	129.6	127.5	126.9	126.1	127.1	127.5
FW Ent #2 Htr 5	~~F~~ C	151.1	149.2	147.9	147.4	148.4	149.6
#1 Htr Drain 4	~~F~~ C	135.5	133.2	132.4	131.6	132.7	133.6
#2 Htr Drain 6	~~F~~ C	160.9	159.5	157.1	156.6	157.8	159.8
Stm to #1 Htr - Temp 1	F	600.9	581.7	566.4	593.7	601.3	600.5
Stm to #1 Htr - Press LOCAL	PSIG	74	68	65	65	66	70
Stm to #2 Htr - Temp 2	F	796.2	775.4	754.0	789.5	796.6	795.5
Stm to #2 Htr - Press LOCAL	PSIG	176	170	156	156	162	170
FW ENT #3 HP HTR TEMP 7	C	192	190.2	188.0	188.2	189.3	191.4
STM TO #3 HP HTR TEMP 10	F	575.2	586.2	563.5	574.5	573.2	555.4
STM TO #3 HP HTR PRESS LOCAL	PSIG	460	440	400	400	420	440
#3 HP HTR DRAIN TEMP 8	C	198.8	197.3	194.4	194.3	195.4	198.1

OVERFIRE PORTS CLOSED @ 0840 HRS.

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO.
JOB NO. : RB-502

PLANT OPERATING DATA

	DATA ITEM		UNITS						
	Test No.			2 →					
	Date			12/11/84					
	Time		Hours	0730	0800	0830	0900	0930	1000
	AIR & GAS TEMPERATURES								
④	~~Flue Gas Lvg Econ~~	24/25	F	~~614.7/616.3~~	~~[illegible]/604.1~~	~~597.5/599.7~~	~~584.6/587.3~~	~~600.5/605.0~~	~~599.7/602.0~~
③	~~Flue Gas Lvg AH~~	20/21	F	264.2/271.8	262.1/270.6	260.0/268.8	257.5/266.8	257.7/266.4	259.2/267.8
④	Flue Gas Lvg Hot Precip	26/27	F	587.8/588.2	574.4/577.2	570.0/572.0	563.6/565.2	565.5/566.7	564.7/566.9
③	Flue Gas Lvg Pri AH	—	F	—	—	—	—	—	—
	Air Lvg FD Fan	12/13	F	61.6/61.3	61.3/62.4	60.9/61.9	61.7/62.9	64.1/64.6	65.4/66.1
⑤	Air Ent Sec AH	14/15	F	105.4/110.8	109.5/113.4	100.7/116.1	110.5/117.5	110.2/117.4	108.9/115.1
⑥	Air Lvg Sec AH	22/23	F	641.8/534.5	533.7/528	529.3/525.6	524.1/522.0	523.5/517.8	522/510.7
	Air Lvg PA Fan	—	F						
⑤	Air Ent Pri AH	—	F						
⑥	Air Lvg Pri AH	—	F						
	Air Ent Pulv	—	F						
①	Ambient Air	18	F	46.9	46.9	45.8	47.5	50.1	51.7
	MISCELLANEOUS								
	Feedwater Flow	702	LB/HR	1736.6	1772.3	1628.7	1790.7	1607.7	1709.5
	SH Spray Flow	704	LB/HR	—	—	—	--	—	—
	RH Spray Flow	703	LB/HR	—	45.06	—	43.53	43.59	41.41
	SH Spray Valve Posit	—	%	—	—	—	—	—	—
	RH Spray Valve Posit	—	%	—	—	—	—	—	—
	* HP Extraction Flow	—	LB/HR			—	—	—	—
⑨	O_2 Lvg Econ	306/307	%	3.21/2.63	3.05/2.69	2.99/2.62	3.03/2.58	3.08/2.63	2.93/2.83
⑧	CO_2 Lvg Econ		%						
	NOx (if avail)								
⑨	O_2 Lvg AH		%						
⑧	CO_2 Lvg AH		%						
	O_2 Lvg Hot Precip		%						
	CO_2 Lvg Hot Precip		%						
	O_2 in Windbox		%						
	CO_2 in Windbox		%						
	NOx or CFA Port Posit								
	+ Fuel Analysis								
	Burner # Out Serv								
㉒	**Relative Humidity**		%						

Advise location of flow nozzle with respect to SH and RH spray take-off.

* - Any high pressure steam extraction upstream of reheater, excluding FW heaters.

+ - Report data available - specific requirements will be requested.

② - Efficiency data

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO

JOB NUMBER -

PLANT OPERATING DATA

DATA ITEM	UNITS	2 →					
Test No.							→
Date		12/11/84					→
Time	Hours	0730	0800	0830	0900	0930	1000
DRAFT LOSS DATA							
~~FD Fan Disch~~	~~"Wg~~						
~~SCAH In (Out)~~	~~"Wg~~						
AH Air In	" Wg						
AH Air Out	" Wg						
Windbox	" Wg						
Furnace	" Wg						
Econ Out	" Wg						
AH Gas In	" Wg						
AH Gas Out	" Wg						
Precip In	" Wg						
Precip Out	" Wg						
ID Fan In	" Wg						
SH Outlet Leg TC's	F						
RH Outlet Leg TC's	F						
PULVERIZER DATA							
Pulverizer #							
㉓ * Coal Flow 813	MLB/HR	154.39	153.98	153.08	152.38	151.84	151.50
* Pri Air Flow	MLB/HR						
* Sec Air Flow	MBL/HR						
Pulv Amps	AMPS						
Pulv Diff	" Wg						
PA Inlet Temp	F						
Pulv Out Temp	F						
PA Flow Damp	%						
PA Temp Cont Damp	%						
Pri Air Fan Amps	AMPS						
PULV. 2-A COAL/AIR TEMP	F	128.3	129.5	128.2	128.5	128.1	126.5
2-B	F	127.5	126.6	127.3	127.8	127.0	125.2
2-C	F	123.2	122.9	123.2	125.8	123.0	121.9
2-D	F	126.1	125.7	125.8	126.3	125.9	124.8

The DRAFT LOSS DATA listed on this page is of value, but not absolutely essential for performance analysis.

* - When indicator scale is in different units, provide conversion factor.

② - Efficiency data

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO, COLORADO

PLANT OPERATING DATA

DATA ITEM		UNITS	2 →					→
Test No.					1200			
Date			12/11/84	→				→
Time		Hours	1030	1100	1130	1300	1330	1400
INSTANT. GENERATION GROSS		MW	278.29	256.57	262.94	290.04	262.00	261.88
BOILER TEMPERATURES								
~~Water to Econ~~	~~509~~	~~F~~	452.9	451.3	457.7	463.5	452.8	452.0
Water Lvg Econ	311	F	538.4	533.9	538.5	550.1	536.2	535.6
Stm Lvg Pri SH	514 / 515	F	742.8/735.8	~~941/941.1~~	755.6/741.6	758.6/749.2	746.8/735	746.4/740
Stm Ent Plat SH	—	F	—	(743.2/736.5	—	—	—	—
Stm Lvg Plat SH	—	F	—	—	—	—	—	—
Stm Ent Sec SH	7 / 8	F	752.7/747.8	742.6/732.8	744.3/736.5	756.4/748.6	741.4/735.7	739.5/739.1
Stm Lvg Sec SH	9	F	1012.1	985.5	992.4	994.6	975.3	993.7
Stm to RH Attemp	11	F	609.9	576.6	586.4	607.5	574.6	588.6
Stm Lvg RH Attemp	511	F	535.7	569.5	590.5	546.0	567.6	572.1
Stm Lvg RH	602	F	971.8	980.6	1005.6	991.8	972.7	1003.1
Water to SH Attemp	507	F	260.1	256.1	256.7	264.1	257.6	256.8
Water to RH Attemp	507	F	260.1	256.1	256.7	264.1	257.6	256.8
BOILER PRESSURES								
Water to Econ	605	PSIG	2688.6	2670.5	2678.5	2704.6	2684.5	2686.5
Drum Press	606	PSIG	2536.1	2510.2	2518.3	2545.8	2502.2	2507.0
PSH in Press	—	PSIG	—	—	—	—	—	—
Stm Lvg Sec SH	601	PSIG	2416.7	2397.9	2392.7	2399.0	2401	2399
RH Inlet	604	PSIG	414.0	414.0	449.3	463.5	421.1	414.1
RH Outlet	603	PSIG	361.0	361.0	398.0	412.9	368.4	361.1
HIGH PRESS FW HEATERS								
FW Lvg #1 Htr		F						
FW Ent #1 Htr	3	~~F~~ C	127.4	126.3	126.5	129.3	128.3	126.4
FW Ent #2 Htr	5	~~F~~ C	149.4	147.3	148.0	151.8	149.3	148.0
#1 Htr Drain	4	~~F~~ C	133.4	131.8	132.3	135.5	134.0	132.1
#2 Htr Drain	6	~~F~~ C	159.5	156.7	157.5	162.0	157.8	157.2
Stm to #1 Htr - Temp	1	F	602.2	576.6	583.2	598.5	575.4	587.4
Stm to #1 Htr - Press	LOCAL	PSIG	72	65	66	75	67	69
Stm to #2 Htr - Temp	2	F	798.4	768.7	775.3	793.1	765.1	782.8
Stm to #2 Htr - Press	LOCAL	PSIG	174	158	160	180	160	158
FW ENT #3 HP HTR TEMP	7	C	191.3	187.9	188.9	193.6	188.8	188.7
STM TO #3 HP HTR TEMP	10	F	599.7	565.6	574.2	554.1	564.8	578.0
STM TO #3 HP HTR PRESS	LOCAL	PSIG	450	400	410	460	460	410
#3 HP HTR DRAIN TEMP	8	C	197.6	194.0	195.2	200.6	195.1	194.9

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO.
JOB NO. : RB-502

PLANT OPERATING DATA

DATA ITEM		UNITS	2 →					
Test No.								
Date			12/11/84 →					
Time		Hours	1030	1100	1130	1300	1330	1400
AIR & GAS TEMPERATURES								
④ Flue Gas Lvg Econ	24/25	F	599.5 ~~599.5~~/603.0	586.3/592.4	590.0/594.9	607/612.7	599.4/604.3	593.5/598.9
③ Flue Gas Lvg AH	20/21	F	259.7/267.5	258.4/268.2	263.0/270.6	265.1/273.2	268.9/272.6	263.8/272.2
④ Flue Gas Lvg Hot Precip	26/27	F	562.7/565.9	561.1/563.5	577.2/577.9	575.2/578.5	574.5/576.6	567.3/570.3
③ Flue Gas Lvg Pri AH	—	F	—	—	—	—	—	—
Air Lvg FD Fan	12/13	F	66.1/66.8	66.9/67.9	68.6/69.5	73.2/74.0	74.8/74.9	73.6/73.8
⑤ Air Ent Sec AH	14/15	F	110.9/116.8	113.8/121.2	119.2/128.6	114.7/120.4	117.8/124.1	118/124.1
⑥ Air Lvg Sec AH	22/23	F	520.7/519.9	520.8/518.3	518.8/514.5	530.5/527.2	533.1/527.8	526.7/523.5
Air Lvg PA Fan	—	F	—	—	—			
⑤ Air Ent Pri AH	—	F	—	—	—		—	
⑥ Air Lvg Pri AH	—	F	—	—	—			
Air Ent Pulv	—	F	—	—	—			
① Ambient Air	18	F	52.7	52.9	56.1	58.5	62.1 ~~58.5~~	61.2
MISCELLANEOUS								
Feedwater Flow	702	LB/HR	1628.7	1604.9	1729.9	1851.0	1680.9	1061.5
SH Spray Flow	704	LB/HR	—	—	—	—	—	—
RH Spray Flow	703	LB/HR	1.07	—	—	31.3	—	—
SH Spray Valve Posit	—	%	—	—	—	—	—	—
RH Spray Valve Posit	—	%	—	—	—	—	—	—
* HP Extraction Flow	—	LB/HR	—	—	—	—	—	—
⑨ O_2 Lvg Econ	306/307	%	3.15/2.61	3.12/2.67	3.1/2.65	3.09/2.79	2.98/2.69	3.11/2.60
⑧ CO_2 Lvg Econ		%						
NOx (if avail)								
⑨ O_2 Lvg AH		%						
⑧ CO_2 Lvg AH		%						
O_2 Lvg Hot Precip		%						
CO_2 Lvg Hot Precip		%						
O_2 in Windbox		%						
CO_2 in Windbox		%						
NOx or CFA Port Posit								
+ Fuel Analysis								
Burner # Out Serv								
㉒ Relative Humidity		%						

Advise location of flow nozzle with respect to SH and RH spray take-off.

* - Any high pressure steam extraction upstream of reheater, excluding FW heaters.

+ - Report data available - specific requirements will be requested.

② - Efficiency data

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO
2
JOB NUMBER = RP-502 -

DATA ITEM	UNITS	2	→				
Test No.							
Date		12/11/84	→				
Time	Hours	1030	1100	1130	1300	1330	1400
DRAFT LOSS DATA							
FD Fan Disch	" Wg						
SCAH In (Out)	" Wg						
AH Air In	" Wg						
AH Air Out	" Wg						
Windbox	" Wg						
Furnace	" Wg						
Econ Out	" Wg						
AH Gas In	" Wg						
AH Gas Out	" Wg						
Precip In	" Wg						
Precip Out	" Wg						
ID Fan In	" Wg						
SH Outlet Leg TC's	F						
RH Outlet Leg TC's	F						
PULVERIZER DATA							
Pulverizer #							
㉓ * Coal Flow 813	MLB/HR	151.06	150.42	150.02	150.19	149.86	149.47
* Pri Air Flow	MLB/HR						
* Sec Air Flow	MBL/HR						
Pulv Amps	AMPS						
Pulv Diff	" Wg						
PA Inlet Temp	F						
Pulv Out Temp	F						
PA Flow Damp	%						
PA Temp Cont Damp	%						
Pri Air Fan Amps	AMPS						
PULV Z-A COAL/AIR TEMP.	F	126.8	128.1	127.9	126.2	129.3	128.7
" Z-B " "	F	125.8	127.4	127.0	125.6	128.5	127.7
" Z-C " "	F	122.4	123.5	123.1	122.4	124.3	123.8
" Z-D " "	F	124.9	126.1	125.9	125.2	127.4	126.8

The DRAFT LOSS DATA listed on this page is of value, but not absolutely essential for performance analysis.

* - When indicator scale is in different units, provide conversion factor.

② - Efficiency data

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO, COLORADO

JOB NUMBER RR-502

PLANT OPERATING DATA

DATA ITEM		UNITS	2	2				
Test No.								
Date			12/11/84	12/11/84				
Time		Hours	1430	1500				
			261.20	259.95				
BOILER TEMPERATURES								
Water to Econ	509	F	450.2	452.5				
Water Lvg Econ	311	F	538.4	538.1				
Stm Lvg Pri SH	514/515	F	747.4/738.7	745/739.9				
Stm Ent Plat SH	—	F						
Stm Lvg Plat SH	—	F						
Stm Ent Sec SH	7/8	F	750.7/743	743.5/737.8				
Stm Lvg Sec SH	9	F	997.1	990.4				
Stm to RH Attemp	11	F	588.8	584.0				
Stm Lvg RH Attemp	511	F	571.3	574.8				
Stm Lvg RH	602	F	998.4	992.5				
Water to SH Attemp	507	F	255.4	256.5				
Water to RH Attemp	507	F	255.4	256.5				
BOILER PRESSURES								
Water to Econ	605	PSIG	2672.5	2674.5				
Drum Press	606	PSIG	2511.9	2515.1				
PSH in Press	—	PSIG						
Stm Lvg Sec SH	601	PSIG	2399.0	2399				
RH Inlet	604	PSIG	407.0	414.0				
RH Outlet	603	PSIG	353.6	361.0				
HIGH PRESS FW HEATERS								
FW Lvg #1 Htr		F						
FW Ent #1 Htr	3	~~F~~ C	126.2	126.2				
FW Ent #2 Htr	5	~~F~~ C	147.7	147.7				
#1 Htr Drain	4	~~F~~ C	131.7	131.7				
#2 Htr Drain	6	~~F~~ C	157.0	157.1				
Stm to #1 Htr - Temp	1	F	600.6	589.7				
Stm to #1 Htr - Press	LOCAL	PSIG	64	65				
Stm to #2 Htr - Temp	2	F	796	783.1				
Stm to #2 Htr - Press	LOCAL	PSIG	158	160				
FW ENT #3 HP HTR TEMP	7	C	188.7	188.5				
STM TO #3 HP HTR TEMP	10	F	577	574.3				
STM TO #3 HP HTR PRESS	LOCAL	PSIG	400	410				
#3 HP HTR DRAIN TEMP	8	C	194.8	194.8				

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO.
JOB NO. : RB-502

1

PLANT OPERATING DATA

DATA ITEM	UNITS						
Test No.							
Date		12/11/84	12/11/84				
Time	Hours	1430	1500				
AIR & GAS TEMPERATURES							
④ Flue Gas Lvg Econ 24/25	F	590.8/597.7	585.3/589.4				
③ Flue Gas Lvg AH 20/21	F	261.5/270.6	259.2/271.1				
④ Flue Gas Lvg Hot Precip 26/27	F	583.1/585.5	556/560.9				
③ Flue Gas Lvg Pri AH —	F	—	—				
Air Lvg FD Fan 12/13	F	74.2/74.6	75.1/75.5				
⑤ Air Ent Sec AH 14/15	F	118.1/124.3	118.8/125.6				
⑥ Air Lvg Sec AH 22/23	F	518.3/520.3	517.3/515.7				
Air Lvg PA Fan —	F						
⑤ Air Ent Pri AH —	F						
⑥ Air Lvq Pri AH —	F						
Air Ent Pulv —	F						
① Ambient Air 18	F	60.2	60.2				
MISCELLANEOUS							
Feedwater Flow 702	LB/HR	1573.2	1631.2				
SH Spray Flow 704	LB/HR	—	—				
RH Spray Flow 703	LB/HR	—	—				
SH Spray Valve Posit —	%	—	—				
RH Spray Valve Posit —	%	—	—				
* HP Extraction Flow —	LB/HR	—	—				
⑨ O_2 Lvg Econ 306/307	%	3.05/2.80	3.04/2.75				
⑧ CO_2 Lvg Econ	%						
NOx (if avail)							
⑨ O_2 Lvg AH	%						
⑧ CO_2 Lvg AH	%						
O_2 Lvg Hot Precip	%						
CO_2 Lvg Hot Precip	%						
O_2 in Windbox	%						
CO_2 in Windbox	%						
NOx or CFA Port Posit							
+ Fuel Analysis							
Burner # Out Serv							
② ~~Relative Humidity~~	%						

Advise location of flow nozzle with respect to SH and RH spray take-off.

* - Any high pressure steam extraction upstream of reheater, excluding FW heaters.

+ - Report data available - specific requirements will be requested.

② - Efficiency data

2

CUSTOMER: PUBLIC SERVICE OF COLORADO; PUEBLO COLORADO
JOB NUMBER = RB-502

PLANT OPERATING DATA

DATA ITEM	UNITS	2	2				
Test No.							
Date		12/11/84	12/11/84				
Time	Hours	1430	1500				
DRAFT LOSS DATA							
~~FD Fan Disch~~	" Wg						
~~SCAH In (Out)~~	" Wg						
AH Air In	" Wg						
AH Air Out	" Wg						
Windbox	" Wg						
Furnace	" Wg						
Econ Out	" Wg						
AH Gas In	" Wg						
AH Gas Out	" Wg						
Precip In	" Wg						
Precip Out	" Wg						
ID Fan In	" Wg						
SH Outlet Leg TC's	F						
RH Outlet Leg TC's	F						
PULVERIZER DATA							
Pulverizer #							
㉓ * Coal Flow 813	MLB/HR	148.86	148.76				
* Pri Air Flow	MLB/HR						
* Sec Air Flow	MBL/HR						
Pulv Amps	AMPS						
Pulv Diff	" Wg						
PA Inlet Temp	F						
Pulv Out Temp	F						
PA Flow Damp	%						
PA Temp Cont Damp	%						
Pri Air Fan Amps	AMPS						
PULV 2-A COAL/AIR TEMP	F	128.9	129.4				
" 2-B " "	F	127.8	128.3				
" 2-C " "	F	124.0	124.4				
" 2-D " "	F	126.6	127.2				
"							

The DRAFT LOSS DATA listed on this page is of value, but not absolutely essential for performance analysis.
* - When indicator scale is in different units, provide conversion factor.
② - Efficiency data

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO, COLORADO
JOB NUMBER RB-502

PLANT OPERATING DATA

DATA ITEM		UNITS	2	→				→
Test No.								
Date			12/12/84	→				→
Time		Hours	0800	0830	0900	0930	1000	1030
INSTANT GROSS		MW	333.58	319.37	320.84	307.09	318.32	317.54
BOILER TEMPERATURES								
~~Water to Econ~~	[illegible]	~~F~~	476.4	473.4	473.6	469.4	473.8	473.7
Water Lvg Econ	311	F	561.7	562.5	558.4	554.8	558.0	558.9
Stm Lvg Pri SH	514 / 515	F	758.6/752.2	753.2/753.3	755.5/750.7	756.4/745.9	759.6/755.2	756.6/750
Stm Ent Plat SH	—	F	–	–	–	–	–	–
Stm Lvg Plat SH	—	F	–	–	–	–	–	–
Stm Ent Sec SH	7 / 8	F	755.4/748.8	750.1/745.2	752.5/749.6	753.5/744.1	760/753.9	754.3/744.5
Stm Lvg Sec SH	9	F	991.7	996.6	994.9	1001.9	1010.2	984.8
Stm to RH Attemp	11	F	624.3	622.7	621.5	620.0	629.8	614.7
Stm Lvg RH Attemp	511	F	574.6	565.6	579.2	570.3	562.9	540.6
Stm Lvg RH	602	F	1009.7	1010.7	1008.5	995.9	1022.9	995.0
Water to SH Attemp	507	F	270	271.2	269.8	268.2	269.4	269.3
Water to RH Attemp	507	F	270	271.2	269.8	268.2	269.4	269.3
BOILER PRESSURES								
Water to Econ	605	PSIG	2740.8	2730.7	2726.7	2714.7	2718.7	2724.7
Drum Press	606	PSIG	2568.4	2581.4	2568.4	2555.5	2550.6	2545.8
PSH in Press	—	PSIG	—	—	—	—	—	—
Stm Lvg Sec SH	601	PSIG	2402.1	2422.9	2404.2	2402.1	2404.2	2403.1
RH Inlet	604	PSIG	541.6	527.4	520.5	499.2	520.9	520.7
RH Outlet	603	PSIG	494.9	480.0	472.8	450.4	473.2	473.0
HIGH PRESS FW HEATERS								
FW Lvg #1 Htr		F						
FW Ent #1 Htr	3	~~F~~ C	133.8	133.9	133.1	132.0	132.9	133.1
FW Ent #2 Htr	5	~~F~~ C	156.5	156.0	155.5	154.0	155.2	155.4
#1 Htr Drain	4	~~F~~ C	140.7	140.4	139.6	138.5	139.4	139.2
#2 Htr Drain	6	~~F~~ C	168.1	166.7	166.4	164.5	166.0	166.5
Stm to #1 Htr - Temp	1	F	587.4	600.3	599.9	591.9	608.5	591.5
Stm to #1 Htr - Press	LOCAL	PSIG	78	87	85	82	83	85
~~Stm to #2 Htr - Temp~~	2	F	792.9	797.8	796.1	785.4	807.3	784.5
~~Stm to #2 Htr - Press~~	LOCAL	PSIG	208	206	202	184	196	200
FW ENT #3 HP HTR TEMP	7	C	198.8	197.7	197.4	195.7	197.3	197.2
STM TO #3 HP HTR TEMP	10	F	577.4	565.3	575.0	571.1	560.9	535.3
STM TO #3 HP HTR PRESS	LOCAL	PSIG	520	520	510	500	500	500
#3 HP HTR DRAIN TEMP	8	C	207.1	205.5	205.2	203.1	204.9	205.2

BOTH OVERFIRE PORTS CLOSED AT 0745 HRS.

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO.
JOB NO. : RB-502

PLANT OPERATING DATA

	DATA ITEM		UNITS	2 →					→
	Test No.								
	Date			12/12/84 →					
	Time		Hours	0800	0830	0900	0930	1000	1030
	AIR & GAS TEMPERATURES								
④	~~Flue Gas Lvg Econ~~	24/25	F	653.2/654.4	652.1/653.3	645.1/651.6	644.2/645.3	[illegible]/657.9	641.2/642.4
③	~~Flue Gas Lvg AH~~	20/21	F	260.8/266.8	261/268.3	261.8/268.0	264.3/271.5	260.9/272.1	260.3/267.5
④	Flue Gas Lvg Hot Precip	26/27	F	597.9/601.1	605.4/606.4	605.9/609.6	604.1/606.6	604.9/607.8	600/602.5
③	Flue Gas Lvg Pri AH	—	F	—	—	—	—	—	—
	Air Lvg FD Fan	12/13	F	47.9/48.6	47.5/47.7	47.3/46.7	47.2/46.0	45.6/45.8	45.7/45.6
⑤	Air Ent Sec AH*	14/15	F	97.5/97.1	95.5/98.1	94.4/97.1	97.9/97.9	97.1/98.4	100/96.8
⑥	Air Lvg Sec AH	22/23	F	544.5/540	551.9/546.6	551.4/547.7	553.2/547.5	552.4/549.3	549.1/546.3
	Air Lvg PA Fan	—	F						
⑤	Air Ent Pri AH	—	F						
⑥	Air Lvg Pri AH	—	F						
	Air Ent Pulv	—	F						
①	Ambient Air	18	F	30.4	29.3	29.7	31.3	31.9	30.7
	MISCELLANEOUS								
	Feedwater Flow	702	LB/HR	2094.9	2025.4	2002.6	1897.7	1947.7	2037.0
	SH Spray Flow	704	LB/HR	—	—	—	—	—	—
	RH Spray Flow	703	LB/HR	35	42.32	31.29	31.83	48.45	52.44
	SH Spray Valve Posit	—	%						
	RH Spray Valve Posit	—	%						
	*HP Extraction Flow	—	LB/HR						
⑨	O_2 Lvg Econ	306/307	%	3.05/2.74	2.93/2.75	3.16/2.68	3.23/2.54	3.14/2.62	2.99/2.67
⑧	CO_2 Lvg Econ		%						
	NOx (if avail)								
⑨	O_2 Lvg AH		%						
⑧	CO_2 Lvg AH		%						
	O_2 Lvg Hot Precip		%						
	CO_2 Lvg Hot Precip		%						
	O_2 in Windbox		%						
	CO_2 in Windbox		%						
	NOx or CFA Port Posit								
	+ Fuel Analysis								
	Burner # Out Serv								
㉒	~~Relative Humidity~~		%						

Advise location of flow nozzle with respect to SH and RH spray take-off.

* - Any high pressure steam extraction upstream of reheater, excluding FW heaters.

+ - Report data available - specific requirements will be requested.

② - Efficiency data

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO

PLANT, OPERATING DATA

DATA ITEM	UNITS	2 →					
Test No.							
Date		12/12/84 →					
Time	Hours	0800	0830	0900	0930	1000	1030
DRAFT LOSS DATA							
FD Fan Disch	" Wg						
SCAH In (Out)	" Wg						
AH Air In	" Wg						
AH Air Out	" Wg						
Windbox	" Wg						
Furnace	" Wg						
Econ Out	" Wg						
AH Gas In	" Wg						
AH Gas Out	" Wg						
Precip In	" Wg						
Precip Out	" Wg						
ID Fan In	" Wg						
SH Outlet Leg TC's	F						
RH Outlet Leg TC's	F						
PULVERIZER DATA							
Pulverizer #							
㉓ * Coal Flow 813	MLB/HR	136.0	138.07	139.66	140.85	142.0	142.97
* Pri Air Flow	MLB/HR						
* Sec Air Flow	MBL/HR						
Pulv Amps	AMPS						
Pulv Diff	" Wg						
PA Inlet Temp	F						
Pulv Out Temp	F						
PA Flow Damp	%						
PA Temp Cont Damp	%						
Pri Air Fan Amps	AMPS						
PULV 2-A COAL/AIR TEMP	F	126	128.0	128.0	129.9	128.4	128.2
" 2-B " "	F	125.6	127.4	127.1	127.7	127.2	127.3
" 2-C " "	F	121.7	123.0	122.8	123.2	123.0	123.4
" 2-D " "	F	125.4	126.6	122.6	127.0	126.7	126.8

The DRAFT LOSS DATA listed on this page is of value, but not absolutely essential for performance analysis.

* - When indicator scale is in different units, provide conversion factor.

② - Efficiency data

3

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO, COLORADO

PLANT OPERATING DATA

DATA ITEM		UNITS	2					→
Test No.								
Date			12/12/84	→				
Time		Hours	1100	1130	1300	1330	1400	1430
INSTANT GROSS GEN.		MW	292.65	305.06	296.52	305.83	290.37	290.89
UNIT ON LOAD DEMAND								
BOILER TEMPERATURES								
~~Water to Econ~~	~~509~~	~~F~~	462.8	469.4	465.0	469.0	465.0	465.1
Water Lvg Econ	311	F	554.3	553.6	554.9	559.4	547.2	549.9
Stm Lvg Pri SH	514/515	F	751.6/740.4	752.7/747.5	754.3/749.5	759/754.2	747.8/742.2	753.6/745
Stm Ent Plat SH	—	F	—	—	—	—	—	—
Stm Lvg Plat SH	—	F	—	—	—	—	—	—
Stm Ent Sec SH	7/8	F	746.1/736.3	750.5/745.2	750.4/745.0	758.1/754.0	746.3/742.6	750.8/742.7
Stm Lvg Sec SH	9	F	985.1	994.2	996.3	986.6	983.8	1001.4
Stm to RH Attemp	11	F	608.1	616.1	613.9	607.6	593.9	610.7
Stm Lvg RH Attemp	511	F	584.2	547.8	541.6	559.6	554.5	537.9
Stm Lvg RH	602	F	987.8	1008.5	1010.3	1000.0	973.0	981.8
Water to SH Attemp	507	F	267.5	267.8	267.0	267.1	266.0	265.3
Water to RH Attemp	507	F	267.5	267.8	267.0	267.1	266.0	265.3
BOILER PRESSURES								
Water to Econ	605	PSIG	2718.7	2716.7	2726.7	2720.7	2698.6	2704.6
Drum Press	606	PSIG	2552.3	2537.7	2549.0	2537.7	2523.2	2529.6
PSH in Press	—	PSIG	—	—	—	—	—	—
Stm Lvg Sec SH	601	PSIG	2426.0	2412.5	2424.0	2408.3	2404.2	2409.4
RH Inlet	604	PSIG	463.8	499.3	478.8	499.5	464.1	466.5
RH Outlet	603	PSIG	413.2	450.5	429.0	450.7	413.6	416.1
HIGH PRESS FW HEATERS								
FW Lvg #1 Htr		F						
FW Ent #1 Htr	3	~~F~~ C	131.2	131.8	131.5	132.1	130.4	130.5
FW Ent #2 Htr	5	~~F~~ C	153.1	153.9	153.5	154.1	151.9	152.3
#1 Htr Drain	4	~~F~~ C	137.4	138.2	137.8	138.4	136.6	136.8
#2 Htr Drain	6	~~F~~ C	163.2	164.3	163.6	164.5	162.0	162.5
Stm to #1 Htr - Temp	1	F	587.8	600.6	603.7	597.1	580.5	583.0
Stm to #1 Htr - Press	LOCAL	PSIG	80	80	77	81	76	80
Stm to #2 Htr - Temp	2	F	780.8	795.0	799.0	792.4	772.4	774.9
Stm to #2 Htr - Press	LOCAL	PSIG	190	190	184	192	182	190
FW ENT #3 HP HTR TEMP	7	C	194.5	195.6	195.1	195.5	193.1	193.6
STM TO #3 HP HTR TEMP	10	F	562.9	545.6	543.3	567.3	551.9	536.6
STM TO #3 HP HTR PRESS	LOCAL	PSIG	480	480	470	490	460	480
#3 HP HTR DRAIN TEMP	8	C	201.5	203.0	202.1	203.1	200.1	200.8

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO.
JOB NO. : RB-502

1

PLANT OPERATING DATA

DATA ITEM		UNITS	2	→				→
Test No.								
Date			12/12/84	→				→
Time		Hours	1100	1130	1300	1330	1400	1430
AIR & GAS TEMPERATURES								
④ ~~Flue Gas Lvg Econ~~	24/25	F	627.7/628.9	622.4/631.2	631.7/630.1	630.4/628.5	[illegible]/621.2	620/622.5
③ ~~Flue Gas~~ Lvg AH	20/21	F	260.4/268.2	210.4/259.0	260.2/265.0	259.8/266.0	258/266.6	263/266.4
④ Flue Gas Lvg Hot Precip	26/27	F	595.9/600.8	593.2/598.5	593.8/597.5	590.9/596.2	587.7/591.8	583.7/588.2
③ Flue Gas Lvg Pri AH	—	F	—	—	—	—	—	—
Air Lvg FD Fan	12/13	F	46.4/46.1	46.8/46.9	47.8/47.5	48/47.7	48.4/48.1	48.7/48.7
⑤ Air Ent Sec AH	14/15	F	100.2/99.4	103.9/99.1	102/100.4	102.4/98.3	102.6/101.4	103.3/101.0
⑥ Air Lvg Sec AH	22/23	F	545/545.4	542.8/542.4	542/541.6	541.2/538.9	540.1/538.8	536.5/534.5
Air Lvg PA Fan	—	F						
⑤ Air Ent Pri AH	—	F						
⑥ Air Lvg Pri AH	—	F						
Air Ent Pulv	—	F						
① Ambient Air	18	F	31.1	31.1	30.8	30.5	31.0	31.1
MISCELLANEOUS								
Feedwater Flow	702	LB/HR	1887.2	1890.7	1876.2	1964.2	1842.9	1819.6
SH Spray Flow	704	LB/HR	—	—	—	—	—	—
RH Spray Flow	703	LB/HR	0.3	45.05	44.67	25.9	25.22	44.37
SH Spray Valve Posit	—	%						
RH Spray Valve Posit	—	%						
*HP Extraction Flow	—	LB/HR						
⑨ O_2 Lvg Econ	306/307	%	2.93/2.63	2.97/2.75	2.87/2.66	2.98/2.87	2.87/2.77	2.96/2.67
⑧ CO_2 Lvg Econ		%						
NOx (if avail)								
⑨ O_2 Lvg AH		%						
⑧ CO_2 Lvg AH		%						
O_2 Lvg Hot Precip		%						
CO_2 Lvg Hot Precip		%						
O_2 in Windbox		%						
CO_2 in Windbox		%						
NOx or CFA Port Posit								
+ Fuel Analysis								
Burner # Out Serv								
㉒ ~~Relative Humidity~~		%						

Advise location of flow nozzle with respect to SH and RH spray take-off.

* - Any high pressure steam extraction upstream of reheater, excluding FW heaters.

+ - Report data available - specific requirements will be requested.

② - Efficiency data

2

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO

PLANT OPERATING DATA

DATA ITEM	UNITS	2					→
Test No.							
Date		12-12-84					→
Time	Hours	1100	1130	1300	1330	1400	1430
DRAFT LOSS DATA							
~~FD Fan Disch~~	" Wg						
~~SCAH In (Out)~~	" Wg						
AH Air In	" Wg						
AH Air Out	" Wg						
Windbox	" Wg						
Furnace	" Wg						
Econ Out	" Wg						
AH Gas In	" Wg						
AH Gas Out	" Wg						
Precip In	" Wg						
Precip Out	" Wg						
ID Fan In	" Wg						
SH Outlet Leg TC's	F						
RH Outlet Leg TC's	F						
PULVERIZER DATA							
Pulverizer #							
㉓ * Coal Flow 813	MLB/HR	143.80	144.51	146.46	146.98	147.22	147.35
* Pri Air Flow	MLB/HR						
* Sec Air Flow	MBL/HR						
Pulv Amps	AMPS						
Pulv Diff	" Wg						
PA Inlet Temp	F						
Pulv Out Temp	F						
PA Flow Damp	%						
PA Temp Cont Damp	%						
Pri Air Fan Amps	AMPS						
PULV 2-A COAL/AIR TEMP.	F	128.4	128.8	128.9	127.7	128.9	127.9
" 2-B " "	F	127.7	127.7	128.6	127.0	127.8	127.0
" 2-C " "	F	123.5	123.5	123.7	123.0	123.0	123.8
" 2-D " "	F	126.8	127.1	127.5	126.3	127.0	126.3

The DRAFT LOSS DATA listed on this page is of value, but not absolutely essential for performance analysis.

* - When indicator scale is in different units, provide conversion factor.

② - Efficiency data

3

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO, COLORADO

PLANT OPERATING DATA

DATA ITEM	UNITS	2 →					
Test No.							
Date		12/12/84	→				
Time	Hours	1500	1530	1600	1630		
INSTANT GEN. GROSS	MW	319.43	343.17				
BOILER TEMPERATURES							
[illegible] 509	F	473.6	480.1				
Water Lvg Econ 311	F	564.4	573.6				
Stm Lvg Pri SH 514 / 515	F	763.4/759.5	777.6/765.3				
Stm Ent Plat SH —	F						
Stm Lvg Plat SH —	F						
Stm Ent Sec SH 7 / 8	F	760.1/757.3	757/748.4				
Stm Lvg Sec SH 9	F	1014.7	1021.7				
Stm to RH Attemp 11	F	633.1	651.5				
Stm Lvg RH Attemp 511	F	569	597.2				
Stm Lvg RH 602	F	1002.2	1053.6				
Water to SH Attemp 507	F	267.6	271.5				
Water to RH Attemp 507	F	267.6	271.5				
BOILER PRESSURES							
Water to Econ 605	PSIG	2714.7	2738.7				
Drum Press 606	PSIG	2534.5	2547.4				
PSH in Press —	PSIG	—	—				
Stm Lvg Sec SH 601	PSIG	2391.7	2392.7				
RH Inlet 604	PSIG	521.1	556.0				
RH Outlet 603	PSIG	473.4	510				
HIGH PRESS FW HEATERS							
FW Lvg #1 Htr	F						
FW Ent #1 Htr 3	~~F~~ C	132.2	134.2				
FW Ent #2 Htr 5	~~F~~ C	154.8	157.2				
#1 Htr Drain 4	~~F~~ C	139.0	141.0				
#2 Htr Drain 6	~~F~~ C	166.1	168.6				
Stm to #1 Htr - Temp 1	F	588	625.4				
Stm to #1 Htr - Press LOCAL	PSIG	88	90				
Stm to #2 Htr - Temp 2	F	782.3	826.8				
Stm to #2 Htr - Press LOCAL	PSIG	210	212				
FW ENT #3 HP HTR TEMP 7	C	197.0	199.8				
STM TO #3 HP HTR TEMP 10	F	569.9	598.5				
STM TO #3 HP HTR PRESS LOCAL	PSIG	530	540				
#3 HP HTR DRAIN TEMP 8	C	205.1	208.1				

NOTE: BOTH OVERFIRE PORTS OPEN TO 10% @ 1445 HRS, TO 20% @ 1455, TO 30% @ 1505, TO 40% @ 1517 HRS.

CUSTOMER: PUBLIC SERVICE OF COLORADO, PUEBLO COLORADO.

JOB NO. : RB-502

1

PLANT OPERATING DATA

	DATA ITEM		UNITS	2	→					
	Test No.									
	Date:			12/12/84	→					
	Time		Hours	1500	1530					
	AIR & GAS TEMPERATURES									
④	Flue Gas Lvg Econ	24/25	F	640.8/642.5	662.5/665.7					
③	Flue Gas Lvg AH	20/21	F	259/236.8	262.1/268.9					
④	Flue Gas Lvg Hot Precip	26/27	F	588.3/591.5	603/607.5					
③	Flue Gas Lvg Pri AH	—	F	—	—					
	Air Lvg FD Fan	12/13	F	48.2/48.2	48.4/47.8					
⑤	Air Ent Sec AH	14/15	F	99.6/97.3	94.9/95.7					
⑥	Air Lvg Sec AH	22/23	F	536.1/534.5	545.9/545.1					
	Air Lvg PA Fan	—	F							
⑤	Air Ent Pri AH	—	F							
⑥	Air Lvg Pri AH	—	F							
	Air Ent Pulv	—	F							
①	Ambient Air	18	F	30.4	30.4					
	MISCELLANEOUS									
	Feedwater Flow	702	LB/HR	1960.5	2128.1					
	SH Spray Flow	704	LB/HR	—	30.77					
	RH Spray Flow	703	LB/HR	43.93	43.73					
	SH Spray Valve Posit	—	%							
	RH Spray Valve Posit	—	%							
	*HP Extraction Flow	—	LB/HR							
⑨	O_2 Lvg Econ	306/307	%	3.03/2.90	3.28/2.31					
⑧	CO_2 Lvg Econ		%							
	NOx (if avail)									
⑨	O_2 Lvg AH		%							
⑧	CO_2 Lvg AH		%							
	O_2 Lvg Hot Precip		%							
	CO_2 Lvg Hot Precip		%							
	O_2 in Windbox		%							
	CO_2 in Windbox		%							
	NOx or CFA Port Posit									
	+ Fuel Analysis									
	Burner # Out Serv									
㉒	~~Relative Humidity~~		%							

Advise location of flow nozzle with respect to SH and RH spray take-off.

* - Any high pressure steam extraction upstream of reheater, excluding FW heaters.

+ - Report data available - specific requirements will be requested.

② - Efficiency data

CUSTOMER: PUBLIC SERVICE $\overset{2}{\text{OF}}$ COLORADO, PUEBLO COLORADO

PLANT OPERATING DATA

DATA ITEM	UNITS	2	2				
Test No.							
Date		12/12/84	12/12/84				
Time	Hours	1500	1530				
DRAFT LOSS DATA							
~~FD Fan Disch~~	~~" Wg~~						
SCAH In (Out)	" Wg						
AH Air In	" Wg						
AH Air Out	" Wg						
Windbox	" Wg						
Furnace	" Wg						
Econ Out	" Wg						
AH Gas In	" Wg						
AH Gas Out	" Wg						
Precip In	" Wg						
Precip Out	" Wg						
ID Fan In	" Wg						
SH Outlet Leg TC's	F						
RH Outlet Leg TC's	F						
PULVERIZER DATA							
Pulverizer #							
㉓ * Coal Flow 813	MLB/HR	147.82	148.72				
* Pri Air Flow	MLB/HR						
* Sec Air Flow	MBL/HR						
Pulv Amps	AMPS						
Pulv Diff	" Wg						
PA Inlet Temp	F						
Pulv Out Temp	F						
PA Flow Damp	%						
PA Temp Cont Damp	%						
Pri Air Fan Amps	AMPS						
PULV. 2-A COAL/AIR TEMP	F	126.9	126.6				
" 2-B " "	F	125.4	124.7				
" 2-C " "	F	122.6	122.1				
" 2-D " "	F	125.2	124.6				

The DRAFT LOSS DATA listed on this page is of value, but not absolutely essential for performance analysis.

* - When indicator scale is in different units; provide conversion factor.

② - Efficiency data

CUSTOMER: PUBLIC SERVICE OF COLORADO. PUEBLO, COLORADO

C-3

WYODAK

GASEOUS EMISSION DATA

SUMMARY OF GASEOUS EMISSIONS

DATE	TIME	GROSS LOAD MWe	EXCESS AIR (%)	MILLS OUT OF SERVICE	ACTUAL CONCENTRATIONS NOx (ppm)	CO (ppm)	CO2 (%)	O2 (%)	SO2 (ppm)	CORRECTED TO 0% O2 NOx (ppm)	NOx (lbs/10^6 Btu)	CO (ppm)	CO2 (%)	SO2 (ppm)
1-31-85	1500	360		D	293	40	15.53	3.95	486	310		49	19.18	598
	1600	359		D	277	53	15.66	3.90	471	340		65	19.23	578
	1700	358		D	277	68	15.63	3.93	441	340		84	19.24	542
	1800	360		D	277	44	15.65	3.95	425	341		54	19.28	523
	1900	360		D	282	56	15.77	3.50	364	338		68	18.93	437
	2000	359		D	275	62	15.77	4.05	344	340		76	19.55	426
	2100	359		D	302	46	15.77	4.15	339	376		58	19.66	422
	2200	359		D	271	46	15.65	4.25	344	340		58	19.62	431
	2300	361		D	292	39	15.65	4.25	359	366		49	19.62	450
1-31-85	2400	361		D	277	31	15.52	4.35	364	349		40	19.58	459
2-1-85	0100	359		D	287	31	15.52	4.30	394	360		39	19.52	496
	0200	366		D	282	31	15.52	4.35	389	355		40	19.58	491
	0800	359		D	280	35	15.15	4.38	417	354		44	19.14	527
	1100	362		D	309	28	15.61	4.15	357	385		35	19.45	444
	1200	357		D	322	27	15.61	4.05	390	399		34	19.34	483
	1300	356		D	289	26	15.54	4.15	395	360		33	19.36	492
	1400	356		D	312	24	15.54	4.05	415	386		30	19.25	515
	1500	354		D	289	23	—	4.10	446	359		28	—	554
	1600	357		D	292	21	—	4.05	466	362		26	—	577
	1800	357		D	289	30	15.33	4.00	505	357		36	18.94	623
	1900	362		D	299	29	15.78	3.92	490	368		35	19.40	602
	2000	359		D	309	29	15.70	4.04	480	383		35	19.44	594
	2100	361		D	297	29	15.70	3.92	490	365		35	19.31	602
	2200	360		D	314	30	15.70	4.02	500	388		37	19.42	618
	2300	357		D	294	29	15.65	4.02	520	364		35	19.36	643
2-1-85	2400	364		D	297	29	15.70	4.02	535	367		35	19.42	661

DATE	TIME	GROSS LOAD MWe	EXCESS AIR (%)	MILLS OUT OF SERVICE	ACTUAL CONCENTRATIONS					CORRECTED TO 0% O_2				
					NO_x (ppm)	CO (ppm)	CO_2 (%)	O_2 (%)	SO_2 (ppm)	NO_x (ppm)	NO_x (lbs/10^6 Btu)	CO (ppm)	CO_2 (%)	SO_2 (ppm)
2-2-85	0100	356		D	316	29	15.70	4.02	736	391		35	18.42	595
	0200	364		D	314	30	15.63	3.97	727	387		36	19.27	590
	0300	361		D	297	29	15.58	4.15	698	370		36	19.41	560
	0400	363		D	297	29	15.70	4.05	687	368		35	19.46	555
	0500	361		D	307	29	15.70	4.02	680	380		35	19.42	550
	0600	354		D	294	31	15.75	3.97	653	363		38	19.43	530
	0700	353		D	289	44	15.88	3.87	643	354		54	19.46	525
	1100	364		D	279	42	15.60	3.90	582	342		52	19.16	714
	1200	364		D	284	40	15.69	3.82	568	347		49	19.18	694
	1300	364		D	303	35	15.57	3.96	603	373		44	19.19	743
	1400	360		D	291	50	15.69	3.80	628	355		62	19.10	767
	1500	361		D	305	45	15.57	3.90	628	374		56	19.12	772
	1600	362		D	292	41	15.16	3.92	663	359		51	18.64	816
	1700	362		D	294	29	15.48	3.96	638	362		35	19.08	786
	1800	354		D	292	30	15.60	3.92	628	359		37	19.18	772
	1900	364		D	289	27	15.60	3.95	603	356		33	19.22	742
	2000	358		D	306	39	15.70	3.90	572	376		47	19.28	703
	2100	355		D	302	36	15.60	4.00	552	373		45	19.27	682
	2200	356		D	299	41	15.68	3.85	547	366		50	19.19	670
	2300	360		D	310	-	15.65	3.90	522	383		-	19.31	644
2-2-85	2400	359		D	289	-	15.60	3.95	562	356		-	19.22	693

DATE	TIME	GROSS LOAD MWe	EXCESS AIR (%)	MILLS OUT OF SERVICE	ACTUAL CONCENTRATIONS					CORRECTED TO 0% O_2				
					NO_x (ppm)	CO (ppm)	CO_2 (%)	O_2 (%)	SO_2 (ppm)	NO_x (ppm)	NO_x (lbs/10^6 Btu)	CO (ppm)	CO_2 (%)	SO_2 (ppm)
2-3-85	0100	355		D	292	–	15.73	3.95	567	359		–	19.37	699
	0200	358		D	290	–	15.68	3.95	572	357		–	19.31	705
	0300	357		D	306	–	15.65	4.05	554	379		–	19.39	687
	0400	359		D	274	–	15.35	4.35	542	345		–	19.37	684
	0500	358		D	287	–	15.60	4.12	542	357		–	19.41	674
	0600	362		D	293	–	15.73	3.90	552	360		–	19.31	678
	0700	358		D	272	–	15.70	4.00	542	336		–	19.39	670
	0800	360		D	278	–	15.85	3.95	567	342		–	19.52	699
	1100	354		D	282	64	15.62	3.80	648	345		78	19.07	792
	1200	359		D	294	54	15.50	4.17	643	367		67	19.33	803
	1300	358		D	270	47	15.45	4.18	679	337		58	19.28	848
	1400	356		D	290	57	15.64	4.00	695	358		70	19.32	859
	1500	355		D	286	42	15.62	4.07	725	355		51	19.37	899
	1600	356		D	290	42	15.72	3.97	730	358		51	19.38	900
	1700	360		D	275	42	15.69	4.04	730	341		51	19.43	903
	1800	364		D	282	47	15.74	3.99	735	348		57	19.44	907
	1900	357		D	272	47	15.72	4.02	760	337		58	19.44	940
	2000	359		D	291	49	15.74	3.97	770	359		61	19.41	950
	2100	356		D	273	47	15.74	4.02	785	338		58	19.47	971
	2200	361		D	287	52	15.69	4.07	801	356		64	19.46	993
	2300	363		D	285	49	15.69	4.07	831	354		61	19.46	1031
2-3-85	2400	356		D	278	49	15.62	4.15	831	347		61	19.49	1036

					ACTUAL CONCENTRATIONS					CORRECTED TO 0% O2				
DATE	TIME	GROSS LOAD MWe	EXCESS AIR (%)	MILLS OUT OF SERVICE	NOx (ppm)	CO (ppm)	CO2 (%)	O2 (%)	SO2 (ppm)	NOx (ppm)	NOx (lb/10⁶ Btu)	CO (ppm)	CO2 (%)	SO2 (ppm)
2-4-85	0100	361		D	280	94	15.62	4.12	831	379		92	19.43	1034
	0200	356		D	292	52	15.62	4.20	811	365		64	19.52	1014
	0300	358		D	280	47	15.50	4.12 *	806	348		58	19.28	1002
	0400	358		D	280	49	15.55	4.12 *	785	348		61	19.34	977
	0500	355		D	263	57	15.62	4.12 *	785	327		71	19.43	977
	0600	353		D	276	59	15.62	4.12 *	791	343		73	19.43	984
	0700	368		D	295	44	15.55	4.12 *	780	367		55	19.34	971
	0900	353		D	272	67	15.45	4.07	774	337		83	19.00	961
	1000	361		D	279	92	15.55	4.09	769	346		114	19.32	955
	1100	360		D	278	54	15.53	4.09	759	345		67	19.29	943
	1200	364		D	289	52	15.60	3.94	724	355		64	19.21	891
	1300	363		D	279	42	15.78	3.94	663	343		51	19.42	816
	1400	367		D	292	42	15.90	3.96	607	359		51	19.60	748
	1500	364		D	303	31	—	4.09	556	376		38	—	690
	1600	358		D	324	29	15.58	3.78	592	395		36	19.00	722
	1700	365		NONE	316	36	15.61	3.89	558	388		44	19.16	685
	1800	360		NONE	316	36	15.61	3.84	553	387		43	19.10	676
	1900	363		NONE	323	48	15.96	3.82	516	395		59	19.51	631
	2000	356		NONE	313	33	15.96	3.87	501	384		40	19.57	617
	2100	355		C	313	38	16.09	3.67	506	380		46	19.49	613
	2200	362		C	298	30	15.96	3.79	465	364		37	19.48	567
	2300	358		C	314	30	15.96	3.77	449	383		37	19.45	548
2-4-85	2400	357		C	308	28	15.84	3.92	423	379		35	19.47	521

* BASED ON CO2 CONCENTRATION

DATE	TIME	GROSS LOAD MWe	EXCESS AIR (%)	MILLS OUT OF SERVICE	ACTUAL CONCENTRATIONS NOx (ppm)	CO (ppm)	CO_2 (%)	O_2 (%)	SO_2 (ppm)	CORRECTED TO 0% O_2 NOx (ppm)	NOx (lb/10^6 Btu)	CO (ppm)	CO_2 (%)	SO_2 (ppm)
2-5-85	0100	352		C	308	31	15.96	3.82	434	377		38	19.51	530
	0200	352		C	303	29	15.84	3.92	429	373		36	19.47	527
	0300	359		C	313	30	15.96	3.75	444	381		37	19.48	541
	0400	358		C	326	-	15.96	3.71	465	396		-	19.38	564
	0500	360		C	308	-	15.96	3.67	449	374		-	19.34	544
	0600	353		C	312	-	16.01	3.67*	434	378		-	19.40	526
	0700	359		C	313	-	16.01	3.67*	447	380		-	19.40	544
	0900	352		C	299	34	15.60	3.70	473	363		42	18.94	574
	1000	355		C	297	36	15.65	3.66	463	360		44	18.95	561
	1100.	353		C	307	31	15.80	3.76	458	374		38	19.24	558
	1200	354		C	312	31	15.90	3.70	443	379		38	19.30	537
	1300	358		C	305	28	15.95	3.75	478	371		35	19.41	582
	1400	361		C	309	28	16.27	3.70	503	375		34	19.75	611
	1500	355		C	314	23	15.90	3.88	579	385		29	19.50	710
	1600	366		C	293	28	15.90	3.90	639	360		34	19.52	785
	1700	364		NONE	330	30	15.38	3.78	601	402		37	18.76	733
	1800	362		NONE	320	34	15.72	3.78	596	391		41	19.17	726
	1900	359		NONE	329	30	15.86	3.80	586	402		37	19.37	715
	2000	363		NONE	325	31	15.91	3.78	631	397		38	19.41	769
	2100	363		NONE	343	29	15.86	3.83	671	410		35	19.40	820
	2200	360		D	282	35	15.74	3.93	701	347		44	19.37	862
	2300	359		D	296	48	15.86	3.90	721	364		59	19.48	885
2-5-85	2400	348		D	292	34	15.82	4.03	726	362		43	19.57	898

* BASED ON CO_2 CONCENTRATION

DATE	TIME	GROSS LOAD MWe	EXCESS AIR (%)	MILLS OUT OF SERVICE	ACTUAL CONCENTRATIONS					CORRECTED TO 0% O2				
					NOx (ppm)	CO (ppm)	CO2 (%)	O2 (%)	SO2 (ppm)	NOx (ppm)	NOx (lbs/10⁶Btu)	CO (ppm)	CO2 (%)	SO2 (ppm)
2-6-85	0100	364		D	277	45	15.84	3.93	721	341		56	19.49	887
	0200	357		D	274	35	15.86	3.98	711	338		44	19.57	877
	0300	363		D	277	45	15.94	3.94	686	347		56	19.62	844
	0400	363		D	284	38	15.99	3.88	691	349		46	19.61	847
	0500	363		D	292	40	15.91	4.03	681	362		50	19.69	843
	0600	368		D	272	38	15.91	3.98	681	336		47	19.63	840
	0700	364		D	268	38	15.86	3.98	651	331		47	19.57	803
	1000	361		D	260	40	14.95	4.00	668	321		50	18.46	825
	1100	352		D	254	42	15.38	4.06	708	315		52	19.07	878
	1200.	352		D	259	43	15.31	3.93	724	318		53	18.83	890
	1300	355		D	269	40	15.55	3.88	855	330		49	19.07	
	1400	352		D	274	40	15.24	3.96	830	337		50	18.77	
	1500	353		D	269	40	15.31	3.96	896	331		50	18.86	
	1600	354		D	267	35	15.48	3.93	891	328		45	19.04	
	1800	354		D	289	55	14.99	4.03	794	357		69	18.55	982
	1900	349		D	264	45	14.99	4.08	763	327		56	18.61	947
	2000	353		D	285	46	14.99	4.13	788	354		57	18.66	981
	2100	351		D	269	50	14.95	4.16	814	335		63	18.63	1015
	2200	349		D	277	58	14.99	4.13	788	345		72	18.66	981
	2300	351		D	267	55	15.07	4.13	783	332		69	18.75	975
2-6-85	2400	357		D	279	54	15.07	4.16	778	348		68	18.79	971

					ACTUAL CONCENTRATIONS					CORRECTED TO 0% O2				
DATE	TIME	GROSS LOAD MWe	EXCESS AIR (%)	MILLS OUT OF SERVICE	NOx (ppm)	CO (ppm)	CO2 (%)	O2 (%)	SO2 (ppm)	NOx (ppm)	NOx (lbs/10⁶ Btu)	CO (ppm)	CO2 (%)	SO2 (ppm)
2-7-85	0100	356		D	276	44	15.56	4.10	763	343		54	19.33	948
	0200	361		D	266	44	15.64	4.07	783	330		54	19.39	972
	0300	356		D	268	49	15.64	4.07	778	352		60	19.39	965
	0400	351		D	251	56	15.69	4.07	794	311		69	19.46	984
	0500	349		D	254	56	15.64	4.10	819	316		70	19.43	1015
	0600	359		D	260	58	15.69	4.02	834	321		72	17.40	1032
	0700	351		D	256	54	15.76	4.02	865	316		66	17.49	1069
	1100	355		D	254	58	15.81	3.98	799	313		72	19.51	986
	1200	364		D	247	68	16.06	3.83	717	302		84	19.64	877
	1300	353		D	259	30	–	4.18	687	323		37	–	857
	1400	362		D	259	28	15.68	3.98	717	320		34	19.35	885
	1600	362		D	265	40	15.12	3.95	866	326		50	18.62	1067
	1700	362		D	267	38	15.47	3.88	958	327		46	18.97	1175
	1800	360		D	267	38	15.73	3.88	958	327		46	19.30	1175
	1900	362		D	275	43	15.86	3.81	953	336		52	19.37	1164
	2000	358		D	275	43	15.73	3.88	917	337		52	19.30	1125
	2100	359		D	269	43	15.73	3.88	917	330		52	19.30	1125
2-7-85	2200	326		D	251	40	15.42	4.18	–	313		50	19.25	–

DATE	TIME	GROSS LOAD MWe	EXCESS AIR (%)	MILLS OUT OF SERVICE	ACTUAL CONCENTRATIONS					CORRECTED TO 0% O2				
					NOx (ppm)	CO (ppm)	CO2 (%)	O2 (%)	SO2 (ppm)	NOx (ppm)	NOx (lbs/10^6 Btu)	CO (ppm)	CO2 (%)	SO2 (ppm)
2-10-85	1100	362		D	263	35	15.65	3.91	675	326		43	19.24	830
	1200	364		D	270	31	15.45	3.96	645	333		39	19.05	795
	1300	362		D	275	31	15.65	3.94	638	339		39	19.27	785
	1400	362		D	290	29	15.65	3.96	630	358		36	19.29	776
	1500	363		D	275	25	15.50	4.14	630	343		31	19.31	784
	1600	363		D	280	22	15.83	4.01	632	346		28	19.57	781
	1700	366		D	275	16	15.95	3.94	638	339		20	19.64	785
	1800	363		D	265	20	15.93	3.98	628	327		25	19.69	774
	1900	365		D	288	25	16.08	3.81	609	352		30	19.65	744
	2000	361		D	285	17	15.95	4.06	604	354		17	19.78	749
	2100	363		D	278	15	15.90	3.96	604	343		18	19.60	745
	2200	361		D	295	15	15.78	4.16	584	366		19	19.68	728
	2300	363		D	285	14	15.70	4.21	579	357		17	19.64	724
2-10-85	2400	363		D	275	14	15.83	4.08	564	342		18	19.65	699

DATE	TIME	GROSS LOAD MWe	EXCESS AIR (%)	MILLS OUT OF SERVICE	ACTUAL CONCENTRATIONS NOx (ppm)	CO (ppm)	CO2 (%)	O2 (%)	SO2 (ppm)	CORRECTED TO 0% O2 NOx (ppm)	NOx (lbs/10^6 Btu)	CO (ppm)	CO2 (%)	SO2 (ppm)
2-11-85	0100	361		D	280	17	15.70	4.11	543	348		22	19.53	675
	0200	363		D	278	17	15.58	4.11	516	346		22	19.37	641
	0300	366		D	291	19	15.65	4.11	487	362		24	19.46	606
	0400	364		D	279	20	15.65	4.16	470	348		25	19.52	586
	0500	368		D	295	21	15.70	4.08	442	366		26	19.49	548
	0600	365		D	280	23	15.70	4.14	435	349		29	19.56	541
	0700	362		D	285	26	15.65	4.24	442	357		32	19.61	553
	0900	357		D	290	28	15.64	4.13	535	361		35	19.46	666
	1000	362		D	278	32	15.71	4.08	550	345		40	19.50	683
	1100	364		D	283	33	15.76	4.00	545	350		41	19.47	673
	1200	366		D	292	34	15.51	4.26	489	366		42	19.46	613
	1300	366		D	268	34	15.64	4.15	484	334		42	19.49	603
	1400	363		D	268	39	15.64	4.15	484	334		48	19.49	603
	1500	366		D	265	41	15.76	4.15	471	329		51	19.53	583
	1600	367		D	285	39	15.26	4.05	487	356		48	19.05	608
	1700	364		D	269	50	15.38	4.18	454	332		62	19.28	561
	1800	370		D	279	50	15.38	3.99	414	348		62	19.43	516
	1900	365		D	269	43	15.58	4.16	414	336		53	19.43	516
	2000	362		D	265	38	15.65	4.16	409	330		47	19.49	521
	2100	364		D	284	33	15.70	4.13	404	354		41	19.55	503
	2200	362		D	284	30	15.58	4.13	389	357		38	19.54	487
	2300	366		D	274	35	15.65	4.13	381	342		35	19.49	475
2-11-85	2400	364		D	284	30	15.65	4.16	371	355		30	19.52	463

					ACTUAL CONCENTRATIONS					CORRECTED TO 0% O2				
DATE	TIME	GROSS LOAD MWe	EXCESS AIR (%)	MILLS OUT OF SERVICE	NOx (ppm)	CO (ppm)	CO2 (%)	O2 (%)	SO2 (ppm)	NOx (ppm)	NOx (lbs/10⁶ Btu)	CO (ppm)	CO2 (%)	SO2 (ppm)
2-12-85	0100	361		D	272	33	15.58	4.16	368	340		41	19.43	459
	0200	361		D	264	35	15.58	4.16	363	330		44	19.43	453
	0300	363		D	271	45	15.58	4.18	361	339		56	19.45	451
	0400	366		D	269	35	15.65	4.16	361	336		44	19.52	451
	0500	365		D	289	32	15.58	4.16	358	361		39	19.43	447
	0600	361		D	264	37	15.65	4.13	368	329		46	19.49	459
	0700	362		D	274	34	15.70	4.13	360	342		42	19.55	459
	0800	367		D	288	46	15.22	4.08	376	357		57	18.89	467
	0900	361		D	270	36	15.30	3.98	381	333		44	18.87	470
	1000	366		D	283	52	15.47	3.93	382	348		69	19.03	470
	1100	365		D	290	61	15.64	3.88	439	356		75	19.19	539
	1200	365		D	272	52	15.60	3.76	502	331		68	18.99	611
	1300	367		D	268	101	15.72	3.68	602	325		122	19.06	730
	1400	367		D	270	111	15.72	3.68	648	327		134	17.06	785
	1500	367		D	270	66	15.84	3.78	658	329		80	19.32	802
	1600	364		D	267	66	15.83	3.85	712	328		81	19.38	872
	1700	363		D	264	66	15.83	3.82	692	323		81	19.35	846
2-12-85	2400	363		D	228	101	—	3.82	561	278		123	—	686

DATE	TIME	GROSS LOAD MWe	EXCESS AIR (%)	MILLS OUT OF SERVICE	ACTUAL CONCENTRATIONS NOx (ppm)	CO (ppm)	CO2 (%)	O2 (%)	SO2 (ppm)	CORRECTED TO 0% O2 NOx (ppm)	NOx (lb/10^6 Btu)	CO (ppm)	CO2 (%)	SO2 (ppm)
2-13-85	0100	362		D	230	111	–	3.87	548	281		136	–	671
	0200	357		D	240	96	–	3.92	538	295		118	-	661
	0300	362		D	235	91	–	3.97	541	289		112	–	667
	0400	360		D	255	68	-	4.05	566	317		85	–	701
	0500	362		D	249	61	-	4.02	574	307		75	–	710
	0600	364		D	261	66	–	4.02	581	323		82	–	719
	0700	364		D	250	51	-	4.00	614	308		63	–	759
	0900	319		D	230	42	15.09	4.61	607	295		54	19.33	778
	1000	273		D	202	31	14.66	4.59	612	258		40	18.76	784
	1100	275		D	202	29	14.97	4.60	604	260		37	19.23	774
	1200	273		D	198	27	14.84	4.76	597	256		35	19.19	772
	1300	275		D	200	30	14.94	4.54	599	256		38	19.06	765
	1400	310		NONE*	246	41	15.38	4.20	589	269		51	19.22	737
	1500	366		NONE*	259	68	15.72	4.00	599	319		85	19.42	740
	1600	367		D	256	54	15.74	4.00	609	316		66	19.45	753
	1700	367		D	256	44	15.74	4.00	601	327		54	19.45	743
	1800	365		D	265	45	15.74	4.00	620	327		56	19.45	765
	1900	368		D	266	58	15.84	3.90	604	326		72	19.46	742
	2000	366		D	264	56	15.79	3.95	630	325		69	19.45	775
	2100	364		D	264	63	15.84	3.95	623	325		78	19.51	767
	2200	368		D	279	50	15.82	3.95	620	343		61	19.84	763
	2300	368		D	289	39	15.74	4.05	635	358		48	19.51	786
2-13-85	2400	364		D	279	41	15.67	4.05	645	345		51	19.42	799

REDUCED COAL FLOW TO D MILL

					ACTUAL CONCENTRATIONS					CORRECTED TO 0% O2				
DATE	TIME	GROSS LOAD MWe	EXCESS AIR (%)	MILLS OUT OF SERVICE	NOx (ppm)	CO (ppm)	CO2 (%)	O2 (%)	SO2 (ppm)	NOx (ppm)	NOx (lbs/10^6 Btu)	CO (ppm)	CO2 (%)	SO2 (ppm)
2-14-85	0100	362		D	263	41	15.63	4.10	635	326		51	19.41	789
	0200	366		D	274	50	15.82	4.08	606	340		61	19.63	753
	0300	362		D	263	44	15.67	4.02	620	325		54	19.38	766
	0400	364		D	276	49	15.62	4.18	620	344		61	19.50	786
	0500	363		D	269	68	15.69	4.18	645	335		85	19.60	805
	0600	328		D	251	41	15.42	4.35	635	316		52	19.46	800
2-14-85	0700	324		D	241	44	15.50	4.35	637	303		55	19.55	803

GAS CONCENTRATION CALCULATION

Date 1-31-85

Test No. 1-31-1 → 1-31-13

Operator ______________

Avg Gas Response, D_{avg}

Actual Gas Concentration, $Ga = (D_{avg} - Z_{avg}) \times G_s / (S_{avg} - Z_{avg})$

Gas Concentration @ 0%, $Ga@0\% = (G_A \times 21)/(21 - \%O_2)$

TIME	Econo Out LOCATION	NOx blue			CO orange			CO2 brown			O2 black			SO2 violet		
		D_{avg}	G_A	G_A@0%	D_{avg}	G_A	G_A@0%	D_{avg}	GA	Ga@0%	D_{avg}	Ga	Ca@0%	D_{avg}	G_A	G_A@0%
~~1423 1430~~	~~1-31-1 ECONO. OUT~~	~~34.5~~	~~305~~	~~374~~	~~12~~	~~38~~	~~46~~	~~45.5~~	~~10.05~~	~~12.42~~	~~45~~	~~4.0~~	not	calibrated ~~52.5~~		
1450 1510	1-31-2 ECONO OUT	33.5	293	310	12.5	40	49	67.5	15.53	19.13	44.5	3.95		53.5	486	598
1520 1529	1-31-3 8th floor soot	33	287	352	12.5	40	49	63.7	14.59	17.86	43.5	3.85		53.3	484	592
- 1537	1-31-4 7th floor	33	287	353	13	43	52	67.5	15.53	19.08	44	3.90		52.5	476	584
- 1601	1-31-5 furnace exit	32	277	340	15	53	65	68	15.66	19.23	44	3.90		52	471	578
1601 1607	1-31-6 IK 9-10	31.8	275	338	17	63	77	68	15.66	19.23	44	3.90		52	471	578
1607 1612	1-31-7 IK 11-12	32	277	342	14	48	59	68	15.66	19.34	45	4.00		52	471	581
1612 1617	1-31-8 IK 15-16	32	277	340	19	73	89	68	15.66	19.23	44	3.90		51.5	466	572
1617 1623	1-31-9 IK 17-18	32.5	282	349	20	78	96	68.3	15.73	19.43	45	4.00		51.5	466	575
1623 1629	1-31-10 IK 13-14	32.5	282	347	16	58	71	68	15.66	19.23	44	3.90		50	451	553
1629 1635	1-31-11 IK 19-20	32.3	280	344	17	63	77	68	15.66	19.23	44	3.90		51	461	566
1635 1639	1-31-12 IK 23-24	32.5	282	346	16.5	60	74	68	15.66	19.17	43.5	3.85		50.5	456	558
1639 1643	1-31-13 IK 25-26	32.5	292	346	16.5	60	74	68.3	15.73	19.26	43.5	3.85		51	461	564

1500

Two EFFECT OF SOOTBLOWING

*

* large effect

C-4
WYODAK
PLANT BOILER LOGS

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FORM NO. 3198 9-80

WYODAK POWER PLANT — STATION LOG

HOUR ENDING	WYODAK GENERATION 11955 Gross Generation Meter	MW	09419 Auxiliary Transformer Meter	MW	68349 Start-up Transformer Meter	MW	NET GEN MWH
1	12315	360	09449	30			330
2	12675	360	09479	30			330
3	13032	357	09508	29			328
4	13388	356	09538	30			326
5	13747	359	09567	29			330
6	14106	359	09597	30			329
Sub Total	2151	2151	178	178			1973
7	14462	356	09627	30			326
8	14816	354	09658	31			323
9	15175	359	09688	30			329
10	15534	359	09718	30			329
11	15896	362	09749	31			331
12	16255	359	09779	30			329
13	16614	359	09809	30			329
14	16974	360	09839	30			330
Sub Total	5819	2869	420	242			2626
15	17336	362	09870	31			331
16	17696	360	09901	31			329
17	18059	363	09931	30			333
18	18420	361	09961	30			331
19	18783	363	09991	30			333
20	19146	363	10021	30			333
21	19508	362	10051	30			332
22	19871	363	10081	30			333
Sub Total	7916	2897	662	242			2655
23	20234	363	10111	30			333
24	20598	364	10141	30			334
Day Total	8643	8643	722	722			7921
Prv Total							
Tl to Date							
		360					

	Net Main Xmtr	Gen Vars Out	Gen Vars In	Aux Xmtr Mvar	Start Up Mvar	ACC 1A2 MW	ACC 1B2 MW	Coal Handling
Pres	85291	04866	02284	67079	57919	50062	96818	18648
Prev	77382	04748	02284	66496	57919	49722	96752	18637
Total	7909	118	–	583	–	340	66	11
1st Mo								

	Coal Integrators A	B	C	D	E	SCALES H1	H2	
Pres	510315	302102	403980	104110	126110	94098	14657	
Prev	485308	273663	375630	104110	098017	91015	11795	
Total	25007	28439	28350	–	28093	3083	2862	
1st Mo								

1350 1421 1417 1404

5492 5945

WYODAK
PLANT OPERATOR LOG

Day MONDAY Date JAN 28 1985

25

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HOUR ENDING	IND GEN	IND AUX	IND START-UP	VARS	VOLTS	Brg Oil Press	Lube Oil Temp	H2 Press	EHC Press	EHC AMPS	Drum Press	Throttle Press	Ambient Air Temp	Exhaust Press	Exhaust Temp	Air Removal Temp	Cold End Temp A	B	AIR HEATER GAS IN · OUT A	B	HOUR ENDING
1	355	30	-	35	22	44.9	114	42.5	1532	27	1950	1824	29	9.5	171		197	206	5.0/13.4	5.5/13.6	1
2	362	30		28	22	44.7	114	42.7	[illegible]	27	1947	1824	25	7.5	156		192	201	5.4/13.7	5.7/13.8	2
3	354	30		30	22	44.8	114	42.3	[illegible]	27	1950	1826	27	10.9	168		191	195	5.1/13.2	5.4/13.2	3
4	354	30		28	22	44.9	114	42.1	1537	27	1957	1832	30	10.0	167		190	195	5.1/12.6	5.7/12.6	4
5	358	30		21	22	44.9	114	46.4	1537	27	1949	1826	27	9.5	161		189	198	5.4/13.8	5.7/13.8	5
6	358	30		38	22	44.8	115	48.3	1525	27	1951	1824	32	10.7	167		197	207	5.4/14.2	6.2/14.2	6
7	357	32	–	46	22	44.8	115.1	47.9	[illegible]	27	1950	1824	34	10.3	161	–	201	215	5.3/13.7	5.6/14.0	7
8	362	31	–	50	22	44.8	114.9	47.0	1537	27	1942	1822	31	8.6	157	–	194	202	5.3/13.6	5.7/13.7	8
9	360	31	–	58	22	44.8	115.2	47.0	1531	27	1950	1824	31	7.8	153	–	194	202	5.7/13.0	5.5/12.9	9
10	363	31	–	58	22	44.7	114.8	46.5	1531	27	1947	1826	33	8.1	154	–	196	206	5.4/13.4	5.8/13.6	10
11	361	31	–	50	22	44.8	115	46.1	1529	27	1949	1821	30	8.3	155	–	203	214	5.8/12.9	5.9/13.7	11
12	357	31	–	50	22	44.8	115	45.9	1532	27	1945	1822	31	7.7	153	[illegible]	201	209	5.0/12.5	5.7/13.8	12
13	360	31	–	47	22	44.8	114.8	45.6	1531	27	1941	1818	31	9.2	160	–	199	209	5.1/12.8	5.9/13.8	13
14	362	31	–	43	22	44.7	114.8	45.2	1532	27	1946	1822	31	8.2	155	–	198	208	5.1/13.2	5.6/13.6	14
15	360	32	–	50	22	44.8	114.8	44.9	1531	27	1948	1826	31	7.3	152	–	203	214	5.7/14.4	5.7/14.5	15
16	360	32	–	52	22	44.9	114	44.6	1532	27	[illegible]	1825	31	6.6	142	–	200	211	5.1/12.4	5.5/13.4	16
17	350	31	–	50	22	44	115	44.4	1536	27	1953	1828	34	8.7	159	–	197	206	5.1/13.2	5.5/13.2	17
18	356	31	–	35	22	45	114.8	44.1	[illegible]	27	1949	1826	31	8.1	156	–	196	205	5.3/13.6	5.4/13.6	18
19	360	31	–	50	22	44.8	114.9	[illegible]	[illegible]	27	1946	1823	32	6.8	145	–	175	206	5.2/14	6/14	19
20	357	31	–	40	22	44.9	114.9	43.5	1530	27	1949	1822	34	7.0	151	–	200	210	5.5/14	5.7/14	20
21	360	31	–	38	22	44.8	114.8	[illegible]	1530	27	1946	[illegible]	32	10.9	149	–	196	204	5.7/13.7	5.8/13.7	21
22	357	31	–	28	22	44.8	115	46.6	1531	27	1945	1824	32	8.1	156	–	197	206	5.3/14	5.9/14	22
23	358	31		32	22	44.9	114	46.2	1530	27	1946	1822	27	6.6	148		200	211	5.1/13.8	5.3/13.8	23
24	360	31		28	22	44.8	114	45.9	1531	27	1946	1824	30	6.7	148		195	203	5.1/13.6	5.0/13.6	24
TOTAL																			/	/	TOTAL

HOUR ENDING	H2 Cold Gas Temp	Soot Blow Air Comp Amps A	B	Condensate Pumps Amps A	B	C	Boiler Feed Pumps Amps A	B	Forced Draft Fan Amps A	B	Induced Draft Fan Amps A	B	Supht Temp	Reheat Temp	Supht Attemp Flow A	B	Rht Spray Flow
1	43		200	56		52	378	382	160	158	270	270	1010	1007	130	170	45
2	43		200	56		52	380	384	162	160	272	272	1006	1008	140	180	80
3	43		200	56		52	380	384	160	160	268	268	1009	1005	130	170	55
4	43		200	56		52	380	384	162	160	270	270	987	998	120	170	60
5	43		202	56		52	380	384	162	160	270	270	1003	1007	140	176	65
6	43		202	56		52	380	384	162	162	274	272	998	1008	116	180	85
7	44	–	201	56	–	52	381	384	162	164	274	273	991	995	80	140	87
8	43	–	190	56	–	52	380	384	164	162	273	271	1005	1006	130	170	78
9	43	–	203	56	–	52	380	383	162	160	267	268	1008	1005	110	160	40
10	43	–	202	56	–	52	380	385	166	165	272	272	1002	1005	130	170	78
11	43	–	200	56	–	52	381	385	[illegible]	163	276	275	1000	991	90	150	60
12	43	–	200	56	–	52	382	385	[illegible]	[illegible]	272	271	1008	1003	120	160	50
13	43	–	201	56	–	52	381	384	[illegible]	[illegible]	272	272	991	999	120	170	70
14	43	–	200	56	–	52	380	384	[illegible]	[illegible]	274	274	1006	1005	140	170	58
15	43	–	202	56	–	52	382	385	162	[illegible]	278	278	997	1007	120	162	78
16	43	85	201	56	–	52	383	386	162	162	270	270	1011	1006	115	155	40
17	43	–	201	56	–	52	383	386	163	162	270	270	994	1000	100	160	53
18	43	–	200	56	–	52	381	386	163	164	272	272	1009	1005	130	165	50
19	43	–	200	56	–	52	381	386	168	168	228	225	994	1007	90	160	60
20	43	–	200	56	–	52	380	385	168	167	225	225	998	1001	80	170	70
21	43	–	202	56	–	52	380	385	165	166	225	225	1006	1005	125	160	57
22	43	–	202	56	–	52	390	385	165	166	228	228	1001	1008	100	160	73
23	43		202	56		52	380	384	164	164	[illegible]	[illegible]	1010	1001	96	160	58
24	43		200	56		52	380	384	164	164	274	274	997	1002	110	160	48
Total																	

WATER	Raw Wtr Tank	Filter Wtr Tank	Treated Wtr Tank	Fuel Oil
23	25	29		25.5
7	20	27	–	[illegible]
15	24	29	–	25.5

IN PLANT SILOS	23	7	15
A	F	F	F
B	F	F	F
C	F	F	F
D	F	F	F
E	621	625	[illegible]

UNIT OPERATOR
2300-0700
0700-1500
1500-2300

SHIFT	FURNACE SLAG CONDITION	SOOT BLOWING LOG Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	IK's & IR's Out of Service
2300 - 0700		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XX	X	
0700 - 1500		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXX	X	
1500 - 2300		XXXXX	XXXXX	XXX	XXX	XXX	XXX	XXX	X	

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ORM NO. 3198 9 80

	WYODAK GENERATION						
HOUR	20598		10141		68349		NET
ENDING	Gross Generation		Auxiliary Transformer		Start-up Transformer		GEN
	Meter	MW	Meter	MW	Meter	MW	MWH
1	20962	362	10171	30			332
2	21320	358	10201	30			328
3	21680	360	10231	30			330
4	22041	361	10261	30			331
5	22401	360	10290	29			331
6	22760	359	10320	30			329
Sub Total	2162	2162	179	179			1983
7	23119	[illegible]	10350	30			328
8	23476	[illegible]	10381	31			[illegible]
9	23832	356	10411	30			326
10	24187	355	10441	30			[illegible]
11	24544	357	10472	31			326
12	24899	355	10503	31			[illegible]
13	25255	359	10534	31			328
14	25614	356	10564	30			326
Sub Total	5016	2854	923	244			2610
15	25978	364	10595	31			333
16	26340	362	10625	30			332
17	26701	361	10656	31			330
18	27061	360	10686	30			330
19	27423	362	10717	31			331
20	27785	362	10747	30			332
21	28145	360	10777	30			330
22	28500	355	10807	30			325
Sub Total	7902	2886	666	243			2643
23	28855	355	10837	30			325
24	29213	358	10867	30			328
Day Total	8615	8615	726	726			7889
Pro Total							
Tl to Date			359				

	Net Main Xmtr	Gen Vars Out	Gen Vars In	Aux Xmtr Mvar	Start Up Mvar	ACC 1A2 MW	ACC 1B2 MW	Coal Handling
Pres	93166	04985	02884	67662	57919	50362	96877	18662
Prev	85291	04866	02884	67079	57919	50062	96818	18648
Total	7875	119	—	583	—	300	59	14
1st Mo								

	Coal Integrators					SCALES		
	A	B	C	D	E	H1	H2	
Pres	534690	330475	432282	104110	154130	96720	18107	
Prev	510315	302102	403980	104110	126110	94098	14657	
Total	24375	28373	28302	—	28020	2622	3450	
1st Mo								

1318 1418 1415 1401

5452 6072

WYODAK
PLANT OPERATOR LOG

Day TUESDAY Date JAN 29 1985

WYODAK POWER PLANT — STATION LOG

HOUR	IND	IND	IND			Brg Oil	Lube Oil	H2	EHC	EHC	Drum	Throttle	Ambient	Exhaust	Exhaust	Air Removal	Cold End Temp		AIR HEATER GAS IN - OUT		HOUR
ENDING	GEN	AUX	START-UP	VARS	VOLTS	Press	Temp	Press	Press	AMPS	Press	Press	Air Temp	Press	Temp	Temp	A	B	A	B	ENDING
1	360	31		32	22	44.8	115	45.5	1522	27	1945	1828	29	8.9	159		196	205	5.2/13.8	5.7/13.8	1
2	360	31		30	22	44.8	114	45.2	1531	27	1946	1824	32	7.9	154		195	205	5.0/13.4	5.6/13.4	2
3	360	31		30	22	44.9	114	44.5	[illegible]	27	[illegible]	1826	25	8.7	158		193	202	[illegible]	6.6/13.6	3
4	362	31		30	22	44.7	115	44.6	1521	27	1953	1830	27	8.8	157		192	202	5.7/14.0	5.7/14.0	4
5	360	31		32	22	44.8	114	44.3	1522	27	1942	1824	29	8.9	159		196	207	5.5/14.2	5.7/14.2	5
6	360	31		35	22	44.8	114	44.0	1521	27	1942	1822	31	8.6	158		196	206	5.3/13.9	5.7/13.5	6
7	[illegible]	31		40	22	[illegible]	[illegible]	[illegible]	[illegible]	27	[illegible]	1826	27	9.1	[illegible]	—	196	205	5.5/14	[illegible]	7
8	353	31	—	40	22	44.8	114	[illegible]	1528	27	[illegible]	1828	32	9.5	161	—	201	211	5.4/13.5	5.6/13.[illegible]	8
9	350	31	—	49	22	44.7	114	45.1	1531	27	1941	1826	27	10.4	162	—	203	213	[illegible]	5.7/14.6	9
10	357	31	—	50	22	44.5	115	44.6	1531	27	1942	1826	26	9.4	161	—	202	211	[illegible]	[illegible]	10
11	360	31	—	50	22	44.7	114	46.2	1533	27	1941	1822	[illegible]	8.4	152	—	202	209	[illegible]	[illegible]	11
12	360	32		27		44.8	119	45.4	[illegible]	27	1942	1822	[illegible]	[illegible]	159	—	[illegible]	206	5.3/15.4	5.7/15.3	12
13	360	31	—	53	22	44.9	114.7	46.7	1531	27	1942	1822	21	9.0	160	—	204	215	5.5/14.4	5.8/13.8	13
14	359	32	—	[illegible]	22	44.8	114	44.6	1529	27	1941	1822	19	9.5	162	—	201	211	[illegible]	[illegible]	14
15	355	32	—	50	22	44.8	114.9	44.3	1540	27	1942	1822	26	8.8	160	—	203	214	5.5/14.2	6/14.2	15
16	352	32	—	46	22	44.8	[illegible]	43.8	1542	27	1946	1821	15	9.1	157	—	[illegible]	216	5.7/13.6	5.6/13.6	16
17	353	31	—	48	22	44.9	115	43.4	1537	27	1941	1826	13	9.7	160	—	200	210	5.4/14.3	6/14.2	17
18	357	31	—	52	22	44.9	115	47.1	1536	27	1940	1822	11	7.0	152	—	199	209	5/13.4	5.2/13.6	18
19	354	31	—	55	22	44.9	114.8	42.5	1532	27	1943	1822	12	7.7	155	—	198	208	5.3/14	5.6/14	19
20	357	31	—	53	22	44.9	114.9	40.2	[illegible]	27	1943	1822	11	8.4	158	—	201	213	5.7/13.2	6/14.2	20
21	350	30	—	45	22	44.8	114.8	[illegible]	1538	27	1942	1825	4	9.8	161	—	200	211	5.2/13.6	5.8/13.6	21
22	350	30	—	45	22	44.8	114.7	46.7	1535	27	1942	1826	9	10	167	—	197	209	5.3/14	5.8/14	22
23	352	30		32	22	44.7	114	46.1	1540	27	1946	1824	4	10.7	171		206	219	5.2/13.8	5.2/13.8	23
24	356	30		30	22	44.7	114	45.6	1537	27	1943	1826	4	9.5	164		201	212	5.3/14.0	5.6/14.4	24
TOTAL																					TOTAL

HOUR	H2 Cold Gas Temp	Soot Blow Air Comp Amps		Condensate Pumps Amps			Boiler Feed Pumps Amps		Forced Draft Fan Amps		Induced Draft Fan Amps		Supht	Reheat	Supht Attemp Flow		Rht Spray
ENDING		A	B	A	B	C	A	B	A	B	A	B	Temp	Temp	A	B	Flow
1	43		207	56		52	380	384	164	162	277	272	1006	1007	130	166	54
2	43		202	56		52	390	384	162	162	272	272	1006	1002	110	160	45
3	43		202	56		52	380	380	162	162	270	270	998	1006	140	160	50
4	43		202	56		52	380	384	162	162	270	270	1005	1008	140	170	66
5	43		202	56		52	380	384	166	164	276	276	996	1005	110	170	[illegible]
6	43		202	56		52	380	384	166	164	278	274	1011	1009	140	170	60
7	[illegible]	—	201	56	—	52	382	387	161	[illegible]	[illegible]	273	1005	1006	120	[illegible]	[illegible]
8	[illegible]		201	56	—	52	[illegible]	387	162	161	270	270	1001	1007	110	170	[illegible]
9	43	—	207	56	—	52	381	386	168	[illegible]	[illegible]	277	1001	1010	110	170	[illegible]
10	43	—	202	56	—	52	382	387	[illegible]	[illegible]	[illegible]	272	1008	1000	140	170	[illegible]
11	43	197	204	56	—	52	[illegible]	385	162	[illegible]	[illegible]	273	997	1003	[illegible]	170	60
12	41		201	56	—	52	[illegible]	[illegible]	162	[illegible]	[illegible]	277	1004	1011	140	170	[illegible]
13	43	—	200	56	—	52	382	385	163	[illegible]	[illegible]	[illegible]	993	991	80	160	80
14	41	—	207	56	—	52	[illegible]	388	167	[illegible]	[illegible]	[illegible]	1026	1004	140	180	65
15	41	—	206	56	—	52	382	386	170	[illegible]	[illegible]	278	998	1012	140	170	84
16	41	—	207	56	—	52	382	386	163	[illegible]	[illegible]	272	1014	994	165	160	62
17	41	—	202	56	—	52	383	386	[illegible]	168	280	280	1005	1009	150	170	85
18	41	—	206	56	—	52	384	386	[illegible]	168	270	270	1010	1005	138	170	62
19	40	—	206	56	—	52	383	386	168	168	225	225	987	994	120	165	65
20	40	—	207	56	—	52	385	388	168	168	280	280	1003	1015	120	165	65
21	40	—	206	56	—	52	381	385	163	162	272	272	1012	1007	130	160	70
22	40	—	208	56	—	52	382	387	168	168	276	276	998	1008	105	165	72
23	40		208	56		52	382	388	168	168	276	276	998	1009	90	160	88
24	40		208	56		52	380	386	164	164	278	276	1013	1007	144	180	78
Total																	

	WATER			
	Raw Wtr Tank	Filter Wtr Tank	Treated Wtr Tank	Fuel Oil
23	24	25		255
7	24.5	25	—	[illegible]
15	25.5	29	—	265

IN PLANT SILOS	23	7	15
A	F	[illegible]	F
B	F	F	F
C	F	[illegible]	F
D	F		F
E	↓19	[illegible]	↓27

UNIT OPERATOR
2300 0700 [illegible]
0700 1500 [illegible]
1500 2300

SHIFT	FURNACE SLAG CONDITION	SOOT BLOWING LOG								IK's & IR's Out of Service
		Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	
2300 - 0700		XXXXX	XXXXX	XXXX	XXXX	XXXX	XXXX	XX	X	
0700 - 1500		XXX	XXX	XXXX	XXX	XXXX	XXXX	XXX	X	
1500 - 2300		XXXXX	XXXXX	XXX	XXX	XXX	XXX	XX	X	

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FORM NO 3198 9 88

WYODAK POWER PLANT – STATION LOG

HOUR ENDING	WYODAK GENERATION 29213 Gross Generation Meter	MW	10867 Auxiliary Transformer Meter	MW	68349 Start up Transformer Meter	MW	NET GEN MWH
1	29570	357	10897	30			327
2	29920	350	10927	30			320
3	30270	350	10957	30			320
4	30630	360	10988	31			329
5	30987	357	11018	30			327
6	31347	360	11047	29			331
Sub Total	2134	2134	180	180			1954
7	[illegible]	[illegible]	11077	30			328
8	32062	[illegible]	11106	29			[illegible]
9	[illegible]	[illegible]	11136	30			323
10	32768	353	11166	30			[illegible]
11	[illegible]	[illegible]	11196	30			327
12	[illegible]	[illegible]	11226	30			323
13	[illegible]	[illegible]	[illegible]	29			[illegible]
14	[illegible]	[illegible]	11285	30			321
Sub Total	4977	2143	418	238			2605
15	38892	352	11314	29			323
16	34902	360	11343	29			331
17	35262	360	11372	29			331
18	35618	356	11401	29			327
19	35975	357	11431	30			327
20	36332	357	11460	29			328
21	36689	357	11490	30			327
22	37046	357	11519	29			328
Sub Total	7833	2856	652	234			2622
23	37402	356	11548	29			327
24	37750	349	11578	30			318
Day Total	8537	8537	711	711			7826
Pre Total							
Tl to Date			356				

	Net Main Xmtr	Gen Vars Out	Gen Vars In	Aux Xmtr Mvar	Start Up Mvar	ACC 1A2 MW	ACC 1B2 MW	Coal Handling
Pres	00986	05105	02284	68228	57919	50492	96919	18679
Prev	93166	04985	02284	67662	57919	50362	96877	18662
Total	7820	120	–	566	–	130	42	16
1st Mo								

	Coal Integrators A	B	C	D	E	SCALES H1	H2	
Pres	555885	358691	460903	104110	181942	96780	24151	
Prev	534690	330475	432782	104110	154130	96720	18107	
Total	21165	28216	28121	—	27812		6044	
1st Mo								

1058 1410 1406 1390

5264

WYODAK
PLANT OPERATOR LOG

Day WEDNESDAY Date JAN 30 1985

HOUR ENDING	IND GEN	IND AUX	IND START UP	VARS	VOLTS	Seal Oil Press	Lube Oil Temp	H2 Press	EHC Press	EHC AMPS	Drum Press	Throttle Press	Ambient Air Temp	Exhaust Press	Exhaust Temp	Air Removal Temp	Cold End Temp A	Cold End Temp B	AIR HEATER GAS IN-OUT A	AIR HEATER GAS IN-OUT B	HOUR ENDING
1	356	30		24	22	44.8	115	45.2	1527	27	1942	1824	3	7.5	161		195	211	5.3/140	5.1/139.0	1
2	350	30		26	22	44.7	114	44.7	1527	27	1941	1834	5	10.9	170		197	210	5.1/126	5.4/132.6	2
3	356	30		32	22	44.9	113	44.2	1527	27	1925	1836	4	9.3	163		200	211	5.3/140	5.4/140	3
4	366	30		[illegible]	22	44.6	115	43.5	[illegible]	27	1940	1836	[illegible]	7.2	153		204	212	5.3/140	5.6/138	4
5	360	30		38	22	44.3	114	43.4	1527	27	1942	1836	1	8.1	158		195	210	5.4/141	5.8/140.0	5
6	360	30		38	22	44.8	114	42.0	[illegible]	27	1935	1824	-4	8.1	155		195	205	5.4/140	5.7/140.8	6
7	357	31	—	[illegible]	22	[illegible]	115	42.6	[illegible]	[illegible]	[illegible]	[illegible]		10.1	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	7
8	360	31	—	53	22	44.9	[illegible]	[illegible]	1534	22	1952	1822	-3	[illegible]	159	—	[illegible]	206	5.1/143	[illegible]	8
9	360	31	—	[illegible]	22	[illegible]	121	[illegible]	1536	22	1936	1822	[illegible]	10.9	[illegible]	—	196	203	[illegible]	5.7/162	9
10	[illegible]	31	—	49	22	[illegible]	[illegible]	[illegible]	1535	22	1950	1822	-2	9.2	166	—	196	203	[illegible]	[illegible]	10
11	360	31	—	50	22	44.1	[illegible]	[illegible]	[illegible]	22	[illegible]	[illegible]		9.5	160	—	[illegible]	[illegible]	[illegible]	[illegible]	11
12	364	31	—	50	22	44.9	[illegible]	[illegible]	1536	22	1401	[illegible]	2	[illegible]	159	—	[illegible]	210	[illegible]	[illegible]	12
13	[illegible]	31	—	6	22	45.0	114	[illegible]	1531	22	[illegible]	[illegible]	2	10.7	160	—	204	216	[illegible]	[illegible]	13
14	[illegible]	30		[illegible]	22	[illegible]	[illegible]	[illegible]	1536	22	[illegible]	1826	2	[illegible]	[illegible]	—	[illegible]	217	[illegible]	[illegible]	14
15	350	30	—	37	22	45.0	114.8	41.7	1530	27	1943	1824	1	12.3	136	—	204	216	5.5/142	5.7/147.2	15
16	357	30	—	39	22	44.8	115.1	41.3	1541	27	1948	1830	2	8.4	160	—	203	215	5.1/142	5.7/142.6	16
17	357	30	—	42	22	44.8	119.7	42.9	1537	22	1944	1828	0	10.0	166	—	199	210	6.2/137	5.4/137.7	17
18	362	30	—	57	22	44.7	115.0	45.6	1536	27	1942	1822	-2	8.1	158	—	192	208	6.4/139	5.7/148.2	18
19	360	30	—	59	22	44.7	114.8	45.2	1528	27	1949	1828	-3	9.1	163	—	195	206	5.5/143	6.0/145.3	19
20	361	30	—	54	22	44.8	115.0	44.8	1535	27	1938	1830	-3	7.6	155	—	198	208	5.5/148	6.2/142.3	20
21	358	30	—	51	22	44.8	114.8	44.4	1540	27	1944	1824	-2	10.0	146	—	205	217	6.4/149	5.7/145	21
22	359	30	—	49	22	44.8	115.0	42.9	1537	27	1942	1826	-4	8.3	158	—	200	211	5.9/136	5.4/142.7	22
23	355	30		38	22	44.9	114	43.5	1532	27	1941	1822	-3	9.7	166		204	216	5.3/143	5.4/143.3	23
24	352	30		24	22	44.8	115	43.1	1527	27	1911	1826	-3	10.8	170		203	215	5.4/144	6.0/144.9	24
TOTAL																			/	/	TOTAL

HOUR ENDING	H2 Cold Gas Temp	Soot Blow Air Comp Amps A	Soot Blow Air Comp Amps B	Condensate Pumps Amps A	B	C	Boiler Feed Pumps Amps A	B	Forced Draft Fan Amps A	B	Induced Draft Fan Amps A	B	Suphi Temp	Reheat Temp	Suphi Attemp Flow A	B	RH Spray Flow
1	40		208	56		52	380	386	166	164	222	222	1009	1004	130	130	60
2	40		209	56		53	382	388	165	163	228	222	958	1003	140	128	60
3	40		208	56		52	382	388	165	164	228	226	1009	1007	156	176	73
4	40		196	56		52	[illegible]	[illegible]	[illegible]	162	280	220	958	1011	143	[illegible]	[illegible]
5	40		208	56		53	383	386	164	163	274	272	1011	1009	142	170	73
6	40		209	56		53	382	386	166	162	276	274	995	1014	140	170	86
7	[illegible]	—	[illegible]	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	274	[illegible]	1010	[illegible]	[illegible]	[illegible]
8	[illegible]	—	[illegible]	56	—	[illegible]	[illegible]	[illegible]	168	[illegible]	[illegible]	272	1009	1011	150	170	87
9	36	[illegible]	[illegible]	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	274	[illegible]	1007	130	170	61
10	37	[illegible]	—	57	—	52	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	272	[illegible]	1013	[illegible]	175	60
11	[illegible]	[illegible]	—	57	—	52	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1009	110	[illegible]	[illegible]
12	[illegible]	[illegible]	—	56	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	272	1013	1037	150	[illegible]	80
13	38	[illegible]	—	[illegible]	—	[illegible]	[illegible]	384	[illegible]	[illegible]	[illegible]	282	996	1009	190	170	85
14	37		—	56	—	[illegible]	383	387	167	[illegible]	[illegible]	276	1014	1011	190	170	65
15	38	198	—	56	—	52	383	387	168	[illegible]	[illegible]	278	1002	1004	135	120	81
16	38	198	—	56	—	52	382	386	166	[illegible]	[illegible]	276	1010	1007	130	165	57
17	38	199	—	56	—	52	384	387	169	[illegible]	275	275	993	1003	135	170	85
18	38	199	—	56	—	52	383	380	168	165	280	279	1014	1010	155	170	79
19	38	200	—	57	—	52	383	386	170	168	280	278	984	997	145	165	81
20	39	198	—	56	—	52	383	386	170	169	280	279	1003	1002	155	170	79
21	39	195	—	56	—	52	385	389	170	169	280	278	987	1003	125	165	82
22	39	200	—	56	—	52	380	384	162	161	271	271	1014	1007	105	175	61
23	39	200		56		52	382	386	165	167	280	279	995	1008	150	120	55
24	39	200		56		52	382	386	166	166	275	276	1015	1007	136	170	64
Total																	

	WATER Raw Wtr Tank	Filter Wtr Tank	T-water Wtr Tank	Fuel Oil
23	20.5	29		26.6
7	20.5	22	—	2
15	21	29.5	—	26

IN PLANT SILOS	23	7	15
A	F	F	F
B	F	F	F
C	F	[illegible]	F
D	F	F	F
E	↓19	↓16	↓18

UNIT OPERATOR	
2300 0700	[illegible]
0700 1500	[illegible]
1500 2300	Thorne

SHIFT	FURNACE SLAG CONDITION	SOOT BLOWING LOG Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	IK's & IR's Out of Service
2300 - 0700		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	X	X	
0700 - 1500		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XX	X	
1500 - 2300		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XX	X	

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FORM NO 3198 9 80

WYODAK GENERATION

HOUR ENDING	Gross Generation 37750 Meter	Gross Generation MW	Auxiliary Transformer 11578 Meter	Auxiliary Transformer MW	Start up Transformer 68349 Meter	Start up Transformer MW	NET GEN MWH
1	38100	350	11607	29			321
2	38455	355	11636	29			326
3	38811	356	11666	30			326
4	39166	355	11696	30			325
5	39520	354	11725	29			325
6	39871	351	11754	29			322
Sub Total	2121	2121	176	176			1945
7	40219	[illegible]	[illegible]	29			328
8	[illegible]	358	[illegible]	29			329
9	[illegible]	[illegible]	[illegible]	[illegible]			[illegible]
10	[illegible]	[illegible]	11872	29			323
11	41648	[illegible]	11902	[illegible]			327
12	42005	[illegible]	[illegible]	31			326
13	42361	356	11963	30			326
14	42720	[illegible]	11994	31			328
Sub Total	4970	2849	416	240			2609
15	43080	360	12028	30			330
16	43439	359	12059	30			329
17	43797	358	12089	30			328
18	44157	360	12114	30			330
19	44517	360	12143	31			329
20	44876	359	12175	30			329
21	45235	357	12204	29			330
22	45594	359	12234	30			329
Sub Total	7844	2874	656	240			2634
23	[illegible]	[illegible]	[illegible]	29			332
24	46316	361	12273	30			331
Day Total	8566	722	715	59			663
Prv Total							
Tl to Date							
	351						

	Net Main Xmtr	Gen Vars Out	Gen Vars In	Aux Xmtr Mvar	Start Up Mvar	ACC 1A2 MW	ACC 1B2 MW	Coal Handling
Pres	09826	05223	[illegible]	68794	57919	50678	96983	18691
Prev	00986	05105	02284	68228	57919	50492	96919	18678
Total	7840	118	–	566	–	186	64	13
1st Mo					–			

	Coal Integrators A	B	C	D	E	SCALES H1	H2	
Pres	[illegible]	[illegible]	[illegible]	104110	210815	96720	300021	
Prev	555885	358961	460403	104110	181942	96720	54151	
Total	21160	1789	1207	–	28873	–	5870	
1st Mo	10580	[illegible]	[illegible]	–	144363	–		

5[illegible]1.2

WYODAK
PLANT OPERATOR LOG

5870

Day THURSDAY Date JAN 31 1985

WYODAK POWER PLANT — STATION LOG

HOUR ENDING	IND GEN	IND AUX	IND START UP	VARS	VOLTS	Brg Oil Press	Lube Oil Temp	H2 Press	EHC Press	EHC AMPS	Drum Press	Throttle Press	Ambient Air Temp	Exhaust Press	Exhaust Temp	Air Removal Temp	Cold End Temp A	Cold End Temp B	Air Heater Gas In - Out A	Air Heater Gas In - Out B	HOUR ENDING
1	352	30	—	36	22	44.8	[illegible]	42.5	[illegible]	27	1546	[illegible]	-2	11.4	171		213	214	5.4/14.4	6.0/14.0	1
2	356	30	—	36	22	44.7	114	[illegible]	[illegible]	27	1948	1826	-1	11.2	165		202	211	5.7/14.8	6.6/14.5	2
3	356	30	—	40	22	44.8	114	41.7	1527	27	1949	1824	-2	9.2	164		200	211	5.5/14.4	5.6/14.3	3
4	356	30	—	[illegible]	22	44.9	114	41.3	1540	27	[illegible]	1830	0	[illegible]	[illegible]		201	214	5.1/14.6	6.1/14.6	4
5	352	30	—	[illegible]	22	44.7	115	41.0	[illegible]	27	1553	1833	-3	11.6	174		203	[illegible]	[illegible]	[illegible]	5
6	350	30	—	36	22	44.8	114	[illegible]	[illegible]	27	[illegible]	1834	[illegible]	11.6	177		[illegible]	210	5.8/14.0	5.6/14.2	6
7	[illegible]	31	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	27	[illegible]	[illegible]	[illegible]	10.5	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	7
8	360	31	—	50	22	44.8	[illegible]	[illegible]	[illegible]	27	[illegible]	[illegible]		[illegible]	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	8
9	360	31	—	[illegible]	22		[illegible]	[illegible]	[illegible]	27	1918	[illegible]	1	[illegible]	162	—	[illegible]	[illegible]	[illegible]	[illegible]	9
10	[illegible]	[illegible]	—	[illegible]	22	[illegible]	[illegible]	[illegible]	[illegible]	27	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—	[illegible]	210	[illegible]	[illegible]	10
11	356	[illegible]	—	[illegible]	22	44.9	[illegible]	[illegible]	[illegible]	27	[illegible]	[illegible]		10.0	161	—	[illegible]	[illegible]	[illegible]	[illegible]	11
12	[illegible]	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	27	1900	[illegible]	[illegible]	[illegible]	158	—	210	[illegible]	[illegible]	[illegible]	12
13	350	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	17	11.9	[illegible]		[illegible]	219	[illegible]	[illegible]	13
14	[illegible]	31	—	38	22	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	10	[illegible]	161	—	201	212	[illegible]	[illegible]	14
15	360	31	—	35	22	44.8	119.7	40.9	1533	27	1950	1822	12	9.2	162	—	212	224	5.1/13.5	5.9/14.3	15
16	359	31	—	34	22	44.8	119.6	40.5	1529	27	1952	1824	12	9.9	164	—	208	219	5.4/13.6	5.2/13.7	16
17	361	31	—	38	22	44.8	114.8	45.1	1529	27	1945	1824	10	9.1	161	—	202	218	5.5/14.2	6.2/14.1	17
18	359	31	—	56	22	44.9	119.3	44.7	1521	27	1950	1827	6	9.6	163	—	215	228	5.4/14.5	5.7/14.4	18
19	362	31	—	55	22	44.8	119.5	44.2	1521	27	1948	1822	6	8.7	160	—	213	226	5.4/14.4	6.2/14.4	19
20	361	30	—	47	22	44.8	115.3	44.0	1521	27	1949	1824	3	9.1	161	—	211	223	5.5/14.3	6.1/14.3	20
21	364	31	—	51	22	44.8	114.8	43.5	1528	27	1948	1824	-1	7.7	153	—	217	231	5.4/14.8	6.1/14.8	21
22	355	30	—	40	22	44.8	115.1	43.2	1521	27	1949	1824	-1	9.7	165	—	214	227	5.4/14.4	5.9/14.4	22
23	[illegible]	[illegible]	—			44.8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1	7.1	152	—	[illegible]	[illegible]	[illegible]	[illegible]	23
24	350	31	—	40	22	44.9	114.9	42.3	[illegible]	27	1952	1826	-5	10	168	—	217	233	5.4/14.8	5.4/14.8	24
TOTAL																			/	/	TOTAL

HOUR ENDING	H2 Cold Gas Temp	Soot Blow Air Comp Amps A	Soot Blow Air Comp Amps B	Condensate Pumps Amps A	Condensate Pumps Amps B	Condensate Pumps Amps C	Boiler Feed Pumps Amps A	Boiler Feed Pumps Amps B	Forced Draft Fan Amps A	Forced Draft Fan Amps B	Induced Draft Fan Amps A	Induced Draft Fan Amps B	Supht Temp	Reheat Temp	Supht Attemp Flow A	Supht Attemp Flow B	Rht Spray Flow
1	39	200		56		52	382	386	164	164	265	268	1008	1008	135	130	50
2	39	200		56		52	[illegible]	383	[illegible]	[illegible]	283	281	1008	1014	138	[illegible]	[illegible]
3	39	200		56		52	250	[illegible]	[illegible]	[illegible]	278	278	1014	1005	140	175	65
4	39	200		56		52	[illegible]	388	170	168	[illegible]	[illegible]	[illegible]	1008	150	[illegible]	80
5	39	[illegible]		[illegible]		52	250	[illegible]	[illegible]	166	[illegible]	[illegible]	[illegible]	1006	[illegible]	[illegible]	80
6	[illegible]	[illegible]		[illegible]		52	[illegible]	[illegible]	166	164	278	278	1004	1008	120	[illegible]	50
7	38	[illegible]	[illegible]	57	—	57	[illegible]	[illegible]	177	170	[illegible]	[illegible]	[illegible]	[illegible]	150	[illegible]	77
8	[illegible]	[illegible]	—	[illegible]	—	57	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	140	[illegible]	64
9	40	[illegible]	—	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	170	[illegible]	[illegible]	988	[illegible]	[illegible]	165	82
10	[illegible]	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	170	[illegible]	[illegible]	[illegible]	1009	140	[illegible]	[illegible]
11	[illegible]	[illegible]	—	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1006	150	[illegible]	[illegible]
12	[illegible]	[illegible]	—	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	141	170	80
13	[illegible]	[illegible]	—	[illegible]	—	57	[illegible]	[illegible]	16[illegible]	[illegible]	[illegible]	[illegible]	1011	1007	[illegible]	[illegible]	50
14	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	168	290	277	[illegible]	1007	140	170	70
15	41	195	—	56	—	52	385	389	169	166	280	278	988	999	100	165	80
16	41	196	—	56	—	52	384	388	164	163	271	271	1011	1005	120	160	49
17	41	[illegible]	—	57	—	52	385	388	170	167	280	279	997	1008	150	120	83
18	41	198	—	56	—	52	386	389	178	172	285	280	1003	1001	130	165	68
19	41	198	—	57	—	52	386	390	176	172	281	280	991	997	135	160	82
20	41	198	—	57	—	52	385	387	171	170	285	281	1012	1009	130	170	80
21	41	199	—	57	—	52	386	390	178	172	289	298	999	1014	135	165	84
22	41	198	—	56	—	52	384	388	172	120	281	280	1012	1005	135	165	65
23	[illegible]	[illegible]	—	57	—	52	387	[illegible]	[illegible]	120	[illegible]	[illegible]	1000	1006	145	170	80
24	[illegible]	196	—	56	—	52	385	[illegible]	173	170	278	272	991	997	90	155	70
Total																	

WATER	Raw Wtr Tank	Filter Wtr Tank	T-area Wtr Tank	Fuel Oil
23	21	22		[illegible]
7	22	23	—	[illegible]
15	24.5	24	—	22

IN PLANT SILOS	23	7	15
A	F	F	F
B	F		F
C	F		F
D	F		F
E	↓22	↓19	↓18

UNIT OPERATOR
2300 0700 [illegible]
0700 1500 [illegible]
1500 2300 Thorne

SHIFT	FURNACE SLAG CONDITION	SOOT BLOWING LOG Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	IK's & IR's Out of Service
2300 - 0700		XXXX	XXXX	XXXX	XX	XXXX	XXXX	XX	–	
0700 - 1500		XXXX	XXXX	X	X	XX	XXXX	XX	X	
1500 2300		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XX	X	

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WYODAK GENERATION

HOUR	[illegible]		12293		28319		NET
ENDING	Gross Generation		Auxiliary Transformer		Start up Transformer		GEN
	Meter	MW	Meter	MW	Meter	MW	MWH
1	46035	[illegible]	[illegible]	30			[illegible]
2	47041	[illegible]	[illegible]	[illegible]			337
3	[illegible]	363	[illegible]	30			[illegible]
4	47769	365	12411	29			[illegible]
5	48132	362	12441	30			[illegible]
6	48493	361	12470	[illegible]			[illegible]
Sub Total	2177	2177	177	177			2000
7	48854	[illegible]	12500	30			331
8	49213	359	12530	[illegible]			328
9	[illegible]	[illegible]	[illegible]	[illegible]			326
10	[illegible]	[illegible]	[illegible]	[illegible]			331
11	50290	[illegible]	12617	29			[illegible]
12	[illegible]	[illegible]	12647	30			[illegible]
13	51003	356	12676	[illegible]			327
14	[illegible]	[illegible]	12706	[illegible]			326
Sub Total	[illegible]	2866	4113	236			2630
15	51716	357	12736	30			327
16	52072	356	12765	29			327
17	52428	356	12794	29			327
18	52788	360	12823	29			331
19	53147	359	12852	29			330
20	53506	359	12881	29			330
21	53864	358	12911	30			328
22	54220	356	12940	29			327
Sub Total	7964	2861	647	234			2627
23	54576	356	12969	29			327
24	54936	360	12998	29			331
Day Total	8620	716	705	58			659
Prv Total							
Tl to Date							
	359						

	Net Main Xmtr	Gen Vars Out	Gen Vars In	Aux Xmtr Mvar	Start Up Mvar	ACC 1A2 MW	ACC 1B2 MW	Coal Handling
Pres	16729	05327	02284	69356	52919	50809	97024	18703
Prev	08826	05222	02284	[illegible]	[illegible]	50678	96983	18691
Total	7903	104	[illegible]	562	—	130	41	12
1st Mo			—		—			

	Coal Integrators					SCALES		
	A	B	C	D	E	H1	H2	
Pres	599129	418940	519327	104110	240204	96720	36002	
Prev	577035	[illegible]	[illegible]	104110	210815	[illegible]	30021	
Total	22094	30195	29719	—	29389	—	5981	
1st Mo	1104.7	1509.75	1485.85	—	1469.45	—		

5570

5981

WYODAK

PLANT OPERATOR LOG

Day [illegible] Date 20.8.1.85

WYODAK POWER PLANT – STATION LOG

HOUR	IND	IND	IND			Brg Oil	Lube Oil	H_2	EHC	EHC	Drum	Throttle	Ambient	Exhaust	Exhaust	Air Removal	Cold End Temp		AIR HEATER GAS IN - OUT		HOUR
ENDING	GEN	AUX	START UP	VARS	VOLTS	Press	Temp	Press	Press	AMPS	Press	Press	Air Temp	Press	Temp	Temp	A	B	A	B	ENDING
1	[illegible]	[illegible]	—	[illegible]	22	[illegible]	[illegible]	42.2	[illegible]		[illegible]	[illegible]	-6	6.5	166	—	210	[illegible]	[illegible]	[illegible]	1
2	350	31	—	33	22	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	-9	5.8	167	—	200	219	[illegible]	[illegible]	2
3	[illegible]	31	—	20	22	[illegible]	[illegible]		[illegible]	27	[illegible]	[illegible]		[illegible]	153	—	[illegible]	[illegible]	[illegible]	[illegible]	3
4	[illegible]	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	1937	-6	7.1	152	—	[illegible]	[illegible]	[illegible]	[illegible]	4
5	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	15	42	1518		[illegible]	1820	-8	[illegible]	152	—	[illegible]	[illegible]	[illegible]	[illegible]	5
6	[illegible]		—	[illegible]	22	[illegible]	[illegible]	40	[illegible]		[illegible]	[illegible]	-8	[illegible]	155	—	[illegible]	222	[illegible]	6.1/14.7	6
7	360	31	—	26	[illegible]				1570	[illegible]	[illegible]	1820	-6	9.7	163	—	208	222	[illegible]	[illegible]	7
8	[illegible]		—	[illegible]	[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	1828	-7	[illegible]	163	—	[illegible]	[illegible]	[illegible]	[illegible]	8
9	360	30	—	[illegible]	22	44.6	[illegible]	[illegible]	1590	[illegible]	[illegible]	1826	-7	9.2	162	—	207	219	[illegible]	[illegible]	9
10	[illegible]	30	—	29	22	[illegible]	115	[illegible]	[illegible]		[illegible]	[illegible]	0	9.7	158	—	207	219	[illegible]	[illegible]	10
11	361	30	—	[illegible]	22	[illegible]	[illegible]	[illegible]	1586	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—	207	220	[illegible]	[illegible]	11
12	[illegible]	30	—	[illegible]	22	[illegible]	115	42	[illegible]	[illegible]	[illegible]	[illegible]	5	10.2	165	—	211	220	[illegible]	[illegible]	12
13	[illegible]	31	—	20	22	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0	10.0	168	—	206	[illegible]	[illegible]	[illegible]	13
14	[illegible]	31	—	20	22	[illegible]	115	41.8	[illegible]	[illegible]	1950	1826	10	9.0	160	—	207	219	[illegible]	[illegible]	14
15	350	30	—	21	22	44.5	114.8	41.5	1583	26	1952	1826	25	10.0	168	—	208	219	5.3/13.1	5.7/13.9	15
16	360	30	—	22	22	44.5	114.8	41.2	1583	25	1949	1822	14	9.2	161	—	200	211	5.4/14.1	5.9/14.0	16
17	359	30	—	20	22	44.5	114.9	40.9	1583	25	1954	1830	12	9.8	163	—	199	210	5.5/14.2	5.9/14.2	17
18	355	30	—	45	22	44.4	114.8	45.7	1586	25	1954	1826	12	10.0	165	—	196	207	5.2/14.1	5.6/14.3	18
19	361	30	—	40	22	44.4	114.8	45.1	1583	25	1952	1824	9	9.6	162	—	193	204	5.4/14.4	5.7/14.3	19
20	360	30	—	40	22	44.4	115.0	44.7	1582	25	1960	1830	10	9.5	162	—	200	211	5.5/14.4	6.0/14.2	20
21	361	30	—	38	22	44.6	115.0	44.3	1584	25	1946	1822	6	8.6	158	—	198	209	5.2/12.9	5.5/13.9	21
22	355	30	—	52	22	44.6	115.1	43.9	1582	25	1950	1822	5	11.2	169	—	202	215	5.3/14.5	5.9/14.8	22
23	350	30	—	48	22	44.6	[illegible]	43.3	1581	25	1952	1825	0	10	165	—	200	216	5.3/14.2	5.6/14.0	23
24	353	30	—	48	22	44.5	114.6	43.1	1580	25	1950	1825	0	10	165	—	197	208	5.5/14.0	5.6/14.1	24
TOTAL																			/	/	TOTAL

HOUR	H2 Cold Gas Temp	Soot Blow Air Comp Amps		Condensate Pumps Amps			Boiler Feed Pumps Amps		Forced Draft Fan Amps		Induced Draft Fan Amps		Supht	Reheat	Supht Attemp Flow		Rht Spray
ENDING		A	B	A	B	C	A	B	A	B	A	B	Temp	Temp	A	B	Flow
1	41	[illegible]	—	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1015	145	[illegible]	80
2	41	[illegible]	—	36	—	[illegible]	383	388	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1006	[illegible]	[illegible]	[illegible]
3	41	[illegible]	—	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1000	155	[illegible]	[illegible]
4	41	—	208	57	—	53	383	[illegible]	170	170	[illegible]	[illegible]	[illegible]	1010	150	[illegible]	[illegible]
5	41	—	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	992	150	[illegible]	[illegible]
6	41	—	[illegible]	[illegible]	[illegible]	[illegible]	380	[illegible]	[illegible]	172	[illegible]	[illegible]	[illegible]	[illegible]	155	[illegible]	80
7	[illegible]		210	[illegible]	[illegible]	[illegible]	380	[illegible]	[illegible]	170	[illegible]	290	[illegible]	[illegible]	140	170	82
8	41	—	203	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	171	[illegible]	[illegible]	1011	1009	[illegible]	[illegible]	[illegible]
9	—	—	210	—	[illegible]	53	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1017	[illegible]	160	170	80
10	45	—	[illegible]	—	[illegible]	53	380	[illegible]	[illegible]	170	[illegible]	[illegible]	[illegible]	[illegible]	140	160	75
11	45	—	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	179	[illegible]	[illegible]	[illegible]	[illegible]	150	170	[illegible]
12	[illegible]	—	[illegible]	—	54	53	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1006	150	[illegible]	[illegible]
13	[illegible]	—	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	280	[illegible]	1004	150	160	[illegible]
14	45	—	188	—	[illegible]	[illegible]	387	[illegible]	170	164	[illegible]	282	1001	1006	[illegible]	165	[illegible]
15	45	—	181	—	53	52	380	385	165	164	273	274	1012	1004	110	155	49
16	45	—	203	—	54	53	381	386	167	165	279	279	1001	1004	125	170	81
17	45	—	203	—	54	53	381	386	168	165	280	279	1011	1008	125	170	66
18	45	—	206	—	54	53	383	388	168	165	280	279	990	1002	95	165	59
19	45	—	206	—	54	53	383	387	170	168	272	280	1003	1004	140	170	71
20	45	—	206	—	54	53	384	388	165	165	279	278	993	1005	95	165	29
21	45	—	205	—	54	53	384	387	165	165	279	278	1008	1007	125	170	65
22	45	—	205	—	54	53	384	386	171	169	285	281	999	1008	125	170	78
23	45	—	207	—	54	53	383	386	[illegible]	165	280	280	1004	1009	120	155	50
24	45	—	207	—	54	53	383	386	170	170	280	280	1001	1008	140	160	82
Total																	

WATER				
	Raw	Filter	Treated	Fuel
	Wtr Tank	Wtr Tank	Wtr Tank	Oil
23	21.5	22.5	—	[illegible]
7	20	21	—	26
15	21	27	—	[illegible]

IN PLANT SILOS				
	23	7	15	
A	F	[illegible]	F	
B	F		F	
C	F		F	
D	[illegible]	F	F	
E	[illegible]	V	820	

UNIT OPERATOR	
2300 0700	[illegible]
0700 1500	[illegible]
1500 2300	Thorne

SHIFT	FURNACE SLAG CONDITION	SOOT BLOWING LOG								IK's & IR's Out of Service
		Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	
2300 - 0700		XYX	YXYX	XYX	[illegible]	[illegible]	YYY	YX	X	
0700 - 1500										
1500 - 2300		XYXX	XYXX	XYXX	XYYX	YXX	XYXX	XY	X	

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FORM NO 319R 9 80

WYODAK GENERATION

HOUR ENDING	Gross Generation 54936		Auxiliary Transformer 12998		Start up Transformer 68349		NET GEN
	Meter	MW	Meter	MW	Meter	MW	MWH
1	55276	360	15028	30			330
2	55656	360	15057	29			331
3	56019	363	15087	30			333
4	56377	358	1511[illegible]	29			[illegible]
5	56739	362	1514[illegible]	30			[illegible]
6	57098	359	1517[illegible]	29			330
Sub Total	2162	2162	177	177			1985
7	[illegible]	[illegible]	15204	29			328
8	57811	356	15234	30			326
9	58163	357	15263	29			328
10	[illegible]	360	[illegible]93	30			[illegible]
11	58888	360	15323	30			330
12	59248	360	[illegible]	30			330
13	[illegible]19	[illegible]	[illegible]3	30			[illegible]
14	[illegible]	356	[illegible]2	29			[illegible]
Sub Total	5030	2868	414	237			2631
15	60326	360	13441	29			331
16	60685	359	13471	30			329
17	61046	361	13560	29			332
18	61407	361	13529	29			332
19	61765	358	13558	29			329
20	62120	355	13588	30			325
21	62478	358	13617	29			329
22	62832	354	13646	29			325
Sub Total	2896	2866	648	234			2632
23	63186	354	13676	30			324
24	[illegible]46	356	13705	29			327
Day Total	8606	710	707	59			651
Pru Total							
Tl to Date							
	359						

	Net Main Xmtr	Gen Vars Out	Gen Vars In	Aux Xmtr Mvar	Start Up Mvar	ACC 1A2 MW	ACC 1B2 MW	Coal Handling
Pres	[illegible]	03[illegible]39	02285	[illegible]22	[illegible]	50939	97073	18707
Prev	16729	03327	02285	[illegible]356	[illegible]	50808	97024	[illegible]
Total	[illegible]88[illegible]	112	–	566	–	131	49	4
1st Mo			–		–			

	Coal Integrators A	B	C	D	E	SCALES H1	H2	
Pres	620884	447748	542987	[illegible]	268560	36720	42109	
Prev	599139	418940	519827	[illegible]	210204	36220	36002	
Total	21445	[illegible]838	[illegible]	–	28356	–	6107	
1st Mo	1072[illegible]	1995[illegible]4	1435[illegible]		19178	–		

5263

6107

WYODAK
PLANT OPERATOR LOG

Day Saturday Date Feb 2 85

WYODAK POWER PLANT – STATION LOG

HOUR ENDING	IND GEN	IND AUX	IND START UP	VARS	VOLTS	Brg Oil Press	Lube Oil Temp	H2 Press	EHC Press	EHC AMPS	Drum Press	Throttle Press	Ambient Air Temp	Exhaust Press	Exhaust Temp	Air Removal Temp	Cool End Temp A	Cool End Temp B	AIR HEATER GAS IN / OUT A	AIR HEATER GAS IN / OUT B	HOUR ENDING
1	350	30	—	[illegible]	[illegible]	44.6	115	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0	10	129	—	[illegible]	[illegible]	[illegible]	[illegible]/137	1
2	[illegible]	30	—	[illegible]	22	44	[illegible]	42	[illegible]	25	1952	1825	1	9.[illegible]	131	—	[illegible]	[illegible]	[illegible]	[illegible]	2
3	356	30	—	42	22	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1	9.0	130	—	[illegible]	[illegible]	[illegible]	[illegible]/144	3
4	[illegible]	30	—	[illegible]	22	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3	9.[illegible]	161	—	[illegible]	[illegible]	[illegible]/14[illegible]	[illegible]	4
5	[illegible]	31	—	[illegible]	22	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3	[illegible]	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]/15	5
6	350	31	—	41	22	44	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1	11.7	172	—	[illegible]	217	[illegible]	[illegible]	6
7	[illegible]	30	—	[illegible]	[illegible]	44	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1	[illegible]	[illegible]	—	197	[illegible]	[illegible]	[illegible]	7
8	360	30	—	45	[illegible]	44	[illegible]	[illegible]	[illegible]	25	[illegible]	[illegible]	0	[illegible]	[illegible]	—	[illegible]	212	[illegible]	[illegible]	8
9	360	31	—	43	22	[illegible]	[illegible]	[illegible]	[illegible]	25	[illegible]	[illegible]	3	10.6	162	—	201	[illegible]	[illegible]	[illegible]	9
10	[illegible]	[illegible]	—	50	22	[illegible]	[illegible]	[illegible]	[illegible]	25	[illegible]	[illegible]	2	[illegible]	161	—	[illegible]	[illegible]	[illegible]	[illegible]	10
11	[illegible]	31	—	47	22	[illegible]	114	[illegible]	[illegible]	25	[illegible]	[illegible]	5	[illegible]	160	—	[illegible]	[illegible]	[illegible]	[illegible]	11
12	[illegible]	31	—	40	22	[illegible]	114	[illegible]	[illegible]	25	[illegible]	1827	4	[illegible]	161	—	[illegible]	[illegible]	[illegible]	[illegible]	12
13	[illegible]	31	—	[illegible]	22	[illegible]	[illegible]	[illegible]	[illegible]	25	[illegible]	[illegible]	6	9	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	13
14	[illegible]	30	—	30	22	44.4	[illegible]	41.6	[illegible]	25	[illegible]	1830	7	[illegible]	168	—	[illegible]	212	[illegible]	5.9/13[illegible]	14
15	362	30	—	21	22	44.5	114.8	41.2	1580	25	1952	1826	8	9.1	159	—	206	217	5.9/14.3	5.9/14.5	15
16	364	30	—	24	22	44.5	114.7	40.9	1580	25	1956	1830	9	8.0	155	—	203	214	5.3/13.7	5.6/13.8	16
17	362	30	—	31	22	44.6	115.0	40.6	1580	25	1954	1828	12	8.8	159	—	199	210	5.3/14.1	5.7/14.2	17
18	361	30	—	41	22	44.6	114.8	40.3	1528	25	1952	1824	7	9.9	159	—	195	205	5.4/14.0	5.5/14.0	18
19	355	30	—	45	22	44.4	114.9	44.4	[illegible]	25	1956	1828	8	10.5	166	—	197	208	5.[illegible]/14.1	5.5/14.1	19
20	351	30	—	41	22	44.5	115.0	44.0	1583	25	1950	1824	7	11.7	171	—	196	207	5.4/14.0	5.7/14.1	20
21	359	30	—	29	22	44.5	115.0	43.6	1583	25	1961	1830	2	10.0	162	—	201	213	5.3/14.2	5.5/14.2	21
22	353	30	—	34	22	44.5	115.0	43.2	1580	25	1954	1828	2	11.2	169	—	195	207	5.9/14.0	5.9/14.2	22
23	[illegible]	30	—	30	22	44.6	115	42.9	1578	25	1953	1826	1	11.7	171	—	201	214	5.5/14.0	5.8/14.5	23
24	[illegible]	30	—	30	22	44.6	[illegible]	[illegible]	[illegible]	25	[illegible]	1824	0	10.1	164	—	198	210	5.[illegible]/14	5.6/14	24
TOTAL																			1	1	TOTAL

HOUR ENDING	H2 Cold Gas Temp	Soot Blow Air Comp Amps A	Soot Blow Air Comp Amps B	Condensate Pumps Amps A	Condensate Pumps Amps B	Condensate Pumps Amps C	Boiler Feed Pumps Amps A	Boiler Feed Pumps Amps B	Forced Draft Fan Amps A	Forced Draft Fan Amps B	Induced Draft Fan Amps A	Induced Draft Fan Amps B	Supht Temp	Reheat Temp	Supht Attemp Flow A	Supht Attemp Flow B	Rht Spray Flow
1	[illegible]	—	206	—	54	53	381	385	[illegible]	[illegible]	[illegible]	[illegible]	1008	1010	140	170	60
2	[illegible]		208	—	54	53	383	386	[illegible]	[illegible]	280	280	1001	1010	120	160	80
3	45		208	—	54	53	[illegible]	386			278	278	[illegible]	987	100	[illegible]	6
4	[illegible]		[illegible]		54		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]
5	[illegible]		201	—	54		[illegible]	386	[illegible]	[illegible]	[illegible]	282	[illegible]	[illegible]	[illegible]	[illegible]	80
6	45	—	207	—	[illegible]	53	382	[illegible]			278	278	1015	[illegible]	[illegible]	[illegible]	[illegible]
7	[illegible]	—	190	—	54	[illegible]	[illegible]	[illegible]	[illegible]	163	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
8	[illegible]	—	204	—	[illegible]	[illegible]	384	[illegible]	[illegible]	163	278	277	1017	[illegible]	[illegible]	[illegible]	[illegible]
9	[illegible]	—	20[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	272	991	[illegible]	140	[illegible]	[illegible]
10	[illegible]	—	[illegible]	—	[illegible]	[illegible]	387	[illegible]	170	[illegible]	282	[illegible]	[illegible]	1009	[illegible]	[illegible]	[illegible]
11	45	—	202	—	54	[illegible]	[illegible]	379	171	163	[illegible]	279	998	[illegible]	100	[illegible]	[illegible]
12	[illegible]		20[illegible]	—	54	[illegible]	[illegible]	387	170	164	281	279	1001	1011	130	161	80
13	[illegible]		[illegible]			[illegible]	[illegible]	387	[illegible]	167	[illegible]	[illegible]	[illegible]	1011	[illegible]	165	[illegible]
14	[illegible]	—	206	—	54	[illegible]	[illegible]	387	165	162	275	273	1007	[illegible]	115	160	50
15	45	—	194	—	54	53	384	386	170	169	281	279	998	1006	125	165	68
16	45	—	204	—	54	53	381	386	163	162	273	273	1014	1006	125	155	42
17	45	—	202	—	54	53	385	388	169	165	279	278	990	1000	105	165	63
18	45	—	206	—	54	53	383	386	169	165	280	279	1003	1004	135	120	60
19	45	—	201	—	54	53	384	386	169	168	280	279	1007	1003	115	160	51
20	45	—	208	—	54	53	385	388	165	164	279	278	1000	1007	125	165	63
21	45	—	111	—	54	53	385	389	166	165	280	279	991	1004	75	165	61
22	45	—	207	—	54	53	383	386	162	160	278	276	1010	1008	130	160	58
23	45	—	207	—	54	53	381	389	170	168	282	280	998	1008	110	165	75
24	45	—	178	—	54	53	38[illegible]	385	[illegible]	162	272	225	1013	1006	130	160	45
Total																	

WATER	Raw Wtr Tank	Filter Wtr Tank	Treated Wtr Tank	Fuel Oil
23	21	29	—	26.5
7	[illegible]	[illegible]	—	26.[illegible]
15	22.5	29	—	26.5

IN PLANT SILOS	23	7	15
A	F	F	F
B	[illegible]		F
C	[illegible]		F
D			F
E	23	17	+29

UNIT OPERATOR	
2300 0700	[illegible]
0700 1500	[illegible]
1500 2300	Thome

SHIFT	FURNACE SLAG CONDITION	SOOT BLOWING LOG Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	IK's & IR's Out of Service
2300 - 0700		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXX	X	
0700 - 1500		XXXX	XXX X	XXX X	XXX X	XXX X	XXXX	XXX	X	
1500 2300		XXX	XXXX	XXX	XXX	XXXX	XXXX	XX	X	

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FORM NO 3198 9 80

HOUR ENDING	WYODAK GENERATION						
	[illegible]2		13205		68319		
	Gross Generation		Auxiliary Transformer		Start up Transformer		NET GEN
	Meter	MW	Meter	MW	Meter	MW	MWH
1	63900	358	13235	30			328
2	[illegible]	358	[illegible]	29			327
3	64617	359	[illegible]	30			329
4	64976	359	[illegible]	30			[illegible]
5	65336	360	[illegible]	[illegible]			[illegible]
6	[illegible]696	[illegible]	[illegible]223	30			[illegible]
Sub Total	[illegible]	[illegible]	[illegible]	[illegible]			[illegible]
7	[illegible]	358	[illegible]	[illegible]			[illegible]
8	66[illegible]11	356	[illegible]	30			326
9	[illegible]7	[illegible]	[illegible]	29			322
10	[illegible]	357	[illegible]	30			323
11	67476	354	14030	29			[illegible]
12	67837	354	14060	30			329
13	6[illegible]193	356	14089	29			327
14	[illegible]	357	14118	29			328
Sub Total	5008	2854	413	235			2619
15	68905	355	14147	29			326
16	69259	354	14176	29			325
17	69616	357	14206	30			327
18	69977	361	14236	30			331
19	70338	361	14265	29			332
20	70699	361	14294	29			332
21	71059	360	14324	30			330
22	71419	360	14353	29			331
Sub Total	7877	2869	648	235			2634
23	71779	360	14384	29			331
24	72141	362	14411	29			333
Day Total	8599	722	706	58			664
Prv Total							
Tl to Date							
	358						

	Net Main Xmtr	Gen Vars Out	Gen Vars In	Aux Xmtr Mvar	Start Up Mvar	ACC 1A2 MW	ACC 1B2 MW	Coal Handling
Pres	32505	[illegible]25	[illegible]	[illegible]86	[illegible]	51023	37121	12715
Prev	[illegible]	[illegible]9	[illegible]	[illegible]	37929	50439	37073	12707
Total	7890	136	-	364	-	134	48	8
1st Mo								

	Coal Integrators					SCALES		
	A	B	C	D	E	H1	H2	
Pres	[illegible]2288	[illegible]	[illegible]	[illegible]	292816	76784	48397	
Prev	[illegible]84	[illegible]2	34[illegible]7	[illegible]0	26[illegible]60	76720	48129	
Total	21704	[illegible]706	21495	-	21256	64	2288	
1st Mo	10852	[illegible]3	147425	—	1962.8			

5508.05 **WYODAK** 6352

PLANT OPERATOR LOG

Day [illegible] Date [illegible]

WYODAK POWER PLANT – STATION LOG

HOUR ENDING	IND GEN	IND AUX	IND START UP	VARS	VOLTS	Brg Oil Press	Lube Oil Temp	H2 Press	EHC Press	EHC AMPS	Drum Press	Throttle Press	Ambient Air Temp	Exhaust Press	Exhaust Temp	Air Removal Temp	Cold End Temp A	Cold End Temp B	AIR HEATER GAS IN - OUT A	AIR HEATER GAS IN - OUT B	HOUR ENDING
1	[illegible]	31	—	[illegible]	22	[illegible]	[illegible]	[illegible]				[illegible]	[illegible]	[illegible]	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	1
2	[illegible]			32	22	[illegible]							[illegible]	9.5	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	2
3	[illegible]	[illegible]		32	22	[illegible]	[illegible]	[illegible]						10.8	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	3
4	[illegible]	31	—	[illegible]	22	[illegible]					[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—			[illegible]	[illegible]	4
5	35[illegible]	31	—		[illegible]	[illegible]	[illegible]	[illegible]	1530	[illegible]	[illegible]	[illegible]	[illegible]	10	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	5
6	[illegible]					[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—			[illegible]	[illegible]	6
7	[illegible]	30	—	30	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	10.5	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	7
8	[illegible]	30	—	[illegible]	22	[illegible]	[illegible]	[illegible]	[illegible]	25	[illegible]	[illegible]	[illegible]	11.9	[illegible]	—	[illegible]	206	[illegible]	[illegible]	8
9	[illegible]	30	—	59	22	[illegible]	[illegible]	[illegible]	[illegible]	25	[illegible]	[illegible]	0	11.2	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	9
10	[illegible]	30	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		25	[illegible]	[illegible]	6	[illegible]	[illegible]	—	[illegible]	211	[illegible]	[illegible]	10
11	[illegible]	31	—	98	22	[illegible]	[illegible]	[illegible]	1582	25	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	11
12	[illegible]	[illegible]	—	50	22	[illegible]	115	[illegible]	[illegible]	25	[illegible]	[illegible]	16	10.7	165	—	208	220	[illegible]	[illegible]	12
13	[illegible]	31	—	30	22	[illegible]	[illegible]	42.3	[illegible]	25	[illegible]	[illegible]	[illegible]	24	[illegible]	—	208	220	[illegible]	[illegible]	13
14	[illegible]	30	—	[illegible]	22	[illegible]	114	[illegible]	[illegible]	25	[illegible]	[illegible]	[illegible]	9.3	[illegible]	—	202	211	[illegible]	[illegible]	14
15	35[illegible]	30	—	32	22	44.5	115.0	41.6	1579	25	1953	1828	12	10.2	166	—	210	222	5.8/13.7	5.9/12.9	15
16	352	30	—	40	22	44.5	114.8	41.4	1581	25	1945	1826	11	12.0	172	—	204	214	5.4/12.6	5.8/12.6	16
17	364	31	—	59	22	44.4	116.0	41.1	1580	25	1948	1828	16	8.1	156	—	203	216	5.4/12.5	5.4/12.6	17
18	366	31	—	79	22	44.5	115.0	40.8	1528	25	1941	1822	10	8.6	158	—	200	212	5.9/12.6	5.4/14.1	18
19	362	30	—	60	22	44.5	115.1	40.5	1579	25	1946	1830	5	8.9	159	—	198	210	5.4/11.6	5.3/12.7	19
20	365	30	—	52	22	44.4	115.0	45.0	1580	25	1946	1826	3	8.2	156	—	198	209	5.3/13.0	5.8/13.9	20
21	359	30	—	50	22	44.4	115.0	44.6	1580	25	1947	1828	2	9.7	163	—	198	210	4.9/13.0	4.7/13.0	21
22	360	30	—	48	22	44.5	115.0	44.1	1579	25	1945	1828	5	10.2	165	—	196	207	5.2/13.6	5.6/13.6	22
23	350	[illegible]	—	40	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	1826	2	10	165	—	194	[illegible]	[illegible]	[illegible]	23
24	[illegible]	30	—	38	22	44.5	[illegible]	41.3	1580	[illegible]	[illegible]0	1828	2	8.6	158	—	192	[illegible]0	[illegible]	[illegible]/13.8	24
TOTAL																			/	/	TOTAL

HOUR ENDING	H2 Cold Gas Temp	Soot Blow Air Comp Amps A	Soot Blow Air Comp Amps B	Condensate Pumps Amps A	Condensate Pumps Amps B	Condensate Pumps Amps C	Boiler Feed Pumps Amps A	Boiler Feed Pumps Amps B	Forced Draft Fan Amps A	Forced Draft Fan Amps B	Induced Draft Fan Amps A	Induced Draft Fan Amps B	Supht Temp	Reheat Temp	Supht Attemp Flow A	Supht Attemp Flow B	Rht Spray Flow
1	[illegible]	—	[illegible]	—	[illegible]	53	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	999	1002	[illegible]	[illegible]	50
2	[illegible]		[illegible]	—	[illegible]	53	3[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	125	[illegible]	[illegible]
3	[illegible]		[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	155	80
4	[illegible]					[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	125	[illegible]	[illegible]
5	[illegible]	—	180		[illegible]	[illegible]	3			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	135	[illegible]	80
6	[illegible]	—		—						[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7	[illegible]		[illegible]		[illegible]	53	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	95	115	[illegible]
8	[illegible]	—	222	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	277	[illegible]	[illegible]	[illegible]	110	[illegible]
9	[illegible]		[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1001	1009	[illegible]	[illegible]	[illegible]
10	[illegible]		[illegible]	—	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1001	[illegible]	[illegible]	[illegible]	58
11	[illegible]	—	[illegible]	—	[illegible]	53	[illegible]	384	[illegible]	[illegible]	[illegible]	[illegible]	991	[illegible]	[illegible]	[illegible]	60
12	[illegible]	—	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	169	[illegible]	271	277	[illegible]	[illegible]	[illegible]	170	[illegible]
13	[illegible]		[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	172	164	[illegible]	[illegible]	[illegible]	1011	175	[illegible]	[illegible]
14	[illegible]		[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	165	162	[illegible]	271	1001	1001	110	[illegible]	[illegible]
15	45	—	203	—	54	53	384	386	162	161	271	271	1008	1007	95	155	41
16	46	—	203	—	54	53	384	386	166	164	273	272	1007	1010	125	165	59
17	46	—	204	—	54	53	383	386	161	[illegible]	270	270	1012	1010	110	155	40
18	46	—	202	—	54	53	385	386	169	168	279	278	1008	1011	135	165	78
19	46	—	201	—	54	53	385	387	164	161	271	271	1010	1011	135	165	56
20	46	—	204	—	54	53	385	387	169	168	279	276	1010	1010	130	165	78
21	45	—	202	—	54	53	388	388	161	160	269	269	1008	1008	110	155	48
22	45	—	202	—	54	53	384	389	165	162	271	271	1006	1008	135	165	78
23	[illegible]	—	222	—	[illegible]	53	[illegible]	388	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	120	160	60
24	[illegible]	—	222	—	54	53	[illegible]	389	163	162	2[illegible]	273	992	1005	[illegible]0	[illegible]60	60
Total																	

	WATER			
	Raw Wtr Tank	Filter Wtr Tank	Treated Wtr Tank	Fuel Oil
23	[illegible]	[illegible]	[illegible]	—
7	[illegible]	[illegible]		[illegible]
15	24.5	29	—	26.5

IN PLANT SILOS	23	7	15
A	[illegible]	[illegible]	F
B			F
C			F
D			F
E	0	[illegible]	424

UNIT OPERATOR	
2300 0700	[illegible]
0700 1500	[illegible]
1500 2300	[illegible]

SHIFT	FURNACE SLAG CONDITION	SOOT BLOWING LOG								IK's & IR's Out of Service
		Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	
2300 - 0700		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
0700 - 1500		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXX	X	
1500 2300		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XX	X	JK-26

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FORM NO. 3198 9-80

WYODAK POWER PLANT – STATION LOG

HOUR	WYODAK GENERATION						NET
	[illegible]		14411		[illegible]		
ENDING	Gross Generation		Auxiliary Transformer		Start up Transformer		GEN
	Meter	MW	Meter	MW	Meter	MW	MWH
1	[illegible]	[illegible]	[illegible]	[illegible]			[illegible]
2	[illegible]	[illegible]	[illegible]	[illegible]			[illegible]
3	[illegible]	357	[illegible]	[illegible]			[illegible]
4	[illegible]71	359	[illegible]	[illegible]			[illegible]
5	[illegible]	[illegible]	[illegible]	[illegible]			[illegible]
6	[illegible]	[illegible]	[illegible]	30			[illegible]
Sub Total	[illegible]	[illegible]	[illegible]	[illegible]			[illegible]
7	74646	360	[illegible]	30			330
8	75009	363	[illegible]48	30			333
9	75369	360	[illegible]	29			331
10	75725	356	14706	29			327
11	76080	355	14736	30			325
12	76441	361	14766	30			331
13	76803	362	14796	30			332
14	77165	362	14826	30			332
Sub Total	5324	2871	415	238			2641
15	77528	363	14856	30			333
16	77892	364	14886	30			334
17	78252	360	14915	29			331
18	78613	361	14945	30			331
19	78975	362	14975	30			332
20	79335	360	15005	30			330
21	79691	356	15034	29			327
22	80049	358	15063	29			329
Sub Total	7506	2884	652	237			2647
23	[illegible]	357	[illegible]	29			328
24	[illegible]763	357	[illegible]122	30			327
Day Total	8322	714	711	59			655
Prv Total							
T1 to Date							
	359						

	Net Main Xmtr	Gen Vars Out	Gen Vars In	Aux Xmtr Mvar	Start Up Mvar	ACC 1A2 MW	ACC 1B2 MW	Coal Handling
Pres	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	51213	97171	18729
Prev	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total	2900	127	–	[illegible]	–	140	50	14
1st Mo			–		–			

	Coal Integrators					SCALES		
	A	B	C	D	E	H1	H2	
Pres	[illegible]	[illegible]	601271	[illegible]	[illegible]	[illegible]	[illegible]	
Prev	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	48297	
Total	[illegible]	[illegible]	22789	8008	[illegible]	–	5980	
1st Mo	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			

5523.7

WYODAK
PLANT OPERATOR LOG

5980

Day [illegible] Date [illegible]

HOUR ENDING	IND GEN	IND AUX	IND START UP	VARS	VOLTS	Brg Oil Press	Lube Oil Temp	H2 Press	EHC Press	EHC AMPS	Drum Press	Throttle Press	Ambient Air Temp	Exhaust Press	Exhaust Temp	Air Removal Temp	Cool End Temp A	Cool End Temp B	AIR HEATER GAS IN - OUT A	AIR HEATER GAS IN - OUT B	HOUR ENDING
1		[illegible]	–	[illegible]		[illegible]		[illegible]		[illegible]	[illegible]	[illegible]	4	[illegible]	[illegible]	–	[illegible]	[illegible]	[illegible]	[illegible]	1
2	[illegible]		–	[illegible]						[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	–	[illegible]	[illegible]	[illegible]	[illegible]	2
3	[illegible]	[illegible]		[illegible]				[illegible]			[illegible]	[illegible]	1	11	172	–	[illegible]	[illegible]	[illegible]	[illegible]	3
4				[illegible]		[illegible]				–	[illegible]	[illegible]					190	199	[illegible]	[illegible]	4
5	[illegible]	30	–								[illegible]		0	[illegible]	[illegible]	–	[illegible]	[illegible]	[illegible]	[illegible]	5
6		[illegible]							[illegible]	[illegible]	[illegible]		-5	[illegible]		–	[illegible]	[illegible]	[illegible]	[illegible]	6
7			–	[illegible]	[illegible]	44.5		[illegible]	[illegible]	25	[illegible]	[illegible]	-7	[illegible]	[illegible]	–	[illegible]		[illegible]	[illegible]	7
8	[illegible]	31	–	45	22	44.4	115.1	41.6	1578	25	1952	1812	-2	10.81	164	–	192	202	[illegible]	[illegible]	8
9	360	31	–	55	22	44.4	114.6	42.9	1579	25	1952	[illegible]24	0	8.6	157	–	193	202	5.0/13.5	5.4/12.5	9
10	[illegible]	31	–	60	22	44.4	115.[illegible]	44.6	1580	25	1942	1822	0	9.3	160	–	193	203	5.8/12.7	5.8/13.6	10
11	360	31	–	53	22	44.4	115.0	44.0	[illegible]	25	1947	1822	3	8.2	156	–	197	202	4.9/12.7	5.5/13.5	11
12	362	31	–	50	22	44.5	115.0	43.6	1580	25	1944	1822	6	9.2	151	–	199	202	5.0/12.6	5.1/12.1	12
13	365	31	–	41	22	44.4	115.1	43.2	[illegible]	25	1954	1826	7	8.2	156	–	206	210	5.2/14.4	5.5/14.5	13
14	362	31	–	40	22	44.4	114.7	42.8	1578	25	1950	1824	9	8.2	155	–	204	210	5.2/14.0	5.2/14.[illegible]	14
15	366	31	–	36	22	44.5	115.0	42.4	1579	25	1954	1820	9	8.0	155	–	205	219	5.4/13.5	5.2/14.9	15
16	360	30	–	38	22	44.4	115.1	42.1	1578	25	1952	1829	9	7.8	153	–	209	223	5.0/14.0	5.4/14.2	16
17	364	31	–	42	22	44.5	114.8	41.8	1580	25	1948	1824	7	8.5	157	–	205	218	5.2/13.7	5.5/13.9	17
18	[illegible]	30	–	51	22	44.5	115.0	41.4	1578	25	1950	1826	4	9.8	162	–	203	215	5.1/12.6	5.6/13.5	18
19	[illegible]	30	–	54	22	44.5	115.1	41.2	1580	25	1946	1822	5	9.3	160	–	204	216	5.3/13.6	5.7/13.8	19
20	361	30	–	42	22	44.6	115.0	40.9	1580	25	1942	1824	7	9.9	162	–	203	215	[illegible]	5.4/12.7	20
21	[illegible]	30	–	34	22	44.4	115.0	45.2	1580	25	1950	1824	6	7.3	151	–	208	220	5.3/14.1	5.5/14.1	21
22	360	30	–	31	22	44.4	115.0	44.5	1578	25	1952	1828	7	8.7	157	–	207	218	5.0/12.8	5.3/12.9	22
23	[illegible]	30	–	[illegible]	[illegible]	44.5	115	44.1	[illegible]	[illegible]	[illegible]	[illegible]	6	10	164	–	[illegible]	[illegible]	[illegible]	[illegible]	23
24	[illegible]	30	–	33	22	44.5	[illegible]	43.6	[illegible]	[illegible]	[illegible]	1826	6	9.5	163	–	213	225	[illegible]	[illegible]	24
TOTAL																			/	/	TOTAL

HOUR ENDING	H2 Cold Gas Temp	Soot Blow Air Comp Amps A	Soot Blow Air Comp Amps B	Condensate Pumps Amps A	Condensate Pumps Amps B	Condensate Pumps Amps C	Boiler Feed Pumps Amps A	Boiler Feed Pumps Amps B	Forced Draft Fan Amps A	Forced Draft Fan Amps B	Induced Draft Fan Amps A	Induced Draft Fan Amps B	Suprt Temp	Reheat Temp	Suprt Attemp Flow A	Suprt Attemp Flow B	Rht Spray Flow
1	45	–	[illegible]	–	[illegible]	[illegible]		[illegible]	[illegible]				[illegible]	[illegible]	[illegible]	120	[illegible]
2	[illegible]					[illegible]		388	167	[illegible]	[illegible]	[illegible]	991	[illegible]	[illegible]	[illegible]	[illegible]
3			[illegible]		[illegible]	[illegible]	[illegible]	388		[illegible]	[illegible]	[illegible]	986	[illegible]	[illegible]	[illegible]	80
4	[illegible]		[illegible]	–	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]	–
5								[illegible]					[illegible]				[illegible]
6	[illegible]						[illegible]	386	[illegible]			[illegible]	[illegible]	[illegible]			–
7	[illegible]	–	[illegible]		54					[illegible]	[illegible]		996		[illegible]	160	[illegible]
8	45	–	[illegible]	–	54	53	[illegible]	386	[illegible]	[illegible]	222	218	1003	1012	130	160	–
9	45	–	201	–	54	53	382	385	[illegible]	[illegible]	272	272	991	[illegible]	140	160	60
10	45	–	201	–	54	53	[illegible]	384	167	166	272	275	1008	[illegible]	130	160	25
11	45	–	205	–	54	53	382	384	170	162	278	275	1010	1004	120	150	58
12	45	–	200	–	54	53	382	385	[illegible]	163	272	272	1005	1008	140	160	68
13	45	–	200	–	54	53	382	386	161	163	275	275	991	[illegible]	90	160	68
14	45	–	200	–	54	53	[illegible]	386	168	168	[illegible]	[illegible]	1011	[illegible]	140	160	78
15	46	–	202	–	54	53	384	387	173	170	281	282	992	1010	125	125	82
16	45	–	202	–	54	53	383	386	172	170	281	279	1015	1003	100	100	43
17	45	–	196	–	54	53	384	386	165	162	275	273	1007	1009	130	170	85
18	45	–	202	–	54	53	384	386	161	160	271	270	1010	1005	130	120	58
19	45	–	191	–	54	53	384	386	[illegible]	161	271	271	1009	1008	145	165	81
20	45	–	202	–	54	53	384	387	161	160	271	271	1008	1007	155	165	64
21	45	–	202	–	54	53	385	387	166	162	276	275	993	1007	125	160	71
22	45	–	201	–	54	53	384	386	164	161	271	271	1015	1007	130	155	52
23	[illegible]	–	[illegible]	–	[illegible]	[illegible]	[illegible]	388	[illegible]	162	278	275	1001	1006	120	120	76
24	[illegible]	–	202	–	[illegible]	53	[illegible]	388	[illegible]	163	[illegible]	273	1008	1002	100	110	50
Total																	

	WATER			
	Raw Wtr Tank	Filter Wtr Tank	Treated Wtr Tank	Fuel Oil
23	[illegible]	[illegible]	–	[illegible]
7	[illegible]	[illegible]	–	[illegible]
15	18.5	29	—	28.5

	IN PLANT SILOS		
	23	7	15
A	[illegible]	[illegible]	F
B	[illegible]	[illegible]	F
C		[illegible]	F
D		[illegible]	F
E	[illegible]	[illegible]	425

UNIT OPERATOR

2300 0700 [illegible]

0700 1500 [illegible]

1500 2300 Thorne

SHIFT	FURNACE SLAG CONDITION	SOOT BLOWING LOG								IK's & IR's Out of Service
		Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	
2300 - 0700		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
0700 - 1500		XXXX	XXXX	XXXX	XXX	XXX	XXX	XX	X	
1500 - 2300		XXXXX	XXXXX	XXXX	XXXX	XXXX	XXXX	XX	X	

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WYODAK POWER PLANT – STATION LOG

	WYODAK GENERATION						
HOUR	33263		15122		[illegible]		NET
ENDING	Gross Generation		Auxiliary Transformer		Start up Transformer		GEN
	Meter	MW	Meter	MW	Meter	MW	MWH
1	[illegible]	353	[illegible]	28			325
2	[illegible]	355	[illegible]	29			326
3	[illegible]	[illegible]	[illegible]	29			[illegible]
4	[illegible]	[illegible]	[illegible]	29			[illegible]
5	[illegible]	358	[illegible]	[illegible]			[illegible]
6	[illegible]	[illegible]	[illegible]	[illegible]			330
Sub Total	[illegible]	2134	173	177			1961
7	83252	355	15325	30			325
8	83611	359	15354	29			330
9	83967	356	15383	29			327
10	84330	353	15412	29			324
11	84675	355	15442	30			325
12	85028	353	15471	29			324
13	85380	352	15501	30			322
14	85738	358	15530	29			329
Sub Total	4975	2841	408	235			2606
15	86095	357	15557	29			328
16	86454	359	15519	30			329
17	86816	362	15619	30			332
18	87175	359	15649	30			329
19	87537	362	15680	31			331
20	87896	359	15710	30			329
21	88257	361	15741	31			330
22	88615	358	15771	30			328
Sub Total	7852	2877	649	241			2636
23	887[illegible]	357	15801	30			328
24	81333	356	15831	30			330
Day Total	8570	718	701	60			658
Prv Total							
Tl to Date							
	357						

	Net Main Xmtr	Gen Vars Out	Gen Vars In	Aux Xmtr Mvar	Start Up Mvar	ACC 1A2 MW	ACC 1B2 MW	Coal Handling
Pres	[illegible]	05[illegible]9	02285	71622	57919	51433	97256	18740
Prev	[illegible]	05702	[illegible]285	71552	57919	[illegible]	[illegible]71	187[illegible]
Total	7850	107	–	570	–	220	85	11
1st Mo			–		–			

	Coal Integrators					SCALES		
	A	B	C	D	E	H1	H2	
Pres	[illegible]	[illegible]	[illegible]	126331	[illegible]	76784	60339	
Prev	[illegible]	[illegible]	[illegible]221	112118	[illegible]	[illegible]	[illegible]377	
Total	21272	22280	7593	214213	29871	–	5962	
1st Mo	10996	[illegible]	57365	1210145	144455	–		

5598.45 5962

WYODAK

PLANT OPERATOR LOG

Day [illegible] Date [illegible]

l

HOUR	IND	IND	IND			Brg Oil	Lube Oil	H2	EHC	EHC	Drum	Throttle	Ambient	Exhaust	Exhaust	Air Remover	Cntl End Temp		AIR HEATER GAS IN / OUT		HOUR
ENDING	GEN	AUX	START UP	VARS	VOLTS	Press	Temp	Press	Press	AMPS	Press	Press	Air Temp	Press	Temp	Temp	A	B	A	B	ENDING
1	[illegible]	[illegible]	–	32	22	44.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	325	5	11.1	170	–	[illegible]	217	[illegible]	[illegible]	1
2	[illegible]	[illegible]	–	32	22	[illegible]	115	42.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	13	11	162		[illegible]	217	[illegible]	[illegible]	2
3	[illegible]	[illegible]	–		[illegible]	[illegible]	[illegible]				[illegible]	[illegible]	[illegible]	11	158			[illegible]	[illegible]	[illegible]	3
4	350	30		[illegible]	22	[illegible]	[illegible]				[illegible]	[illegible]	[illegible]	[illegible].3	16[illegible]			[illegible]	[illegible]	[illegible]	4
5		[illegible]		[illegible]							[illegible]	[illegible]		[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	5
6	[illegible]	[illegible]		31	22	[illegible]					[illegible]	[illegible]	[illegible]	10	[illegible]			[illegible]	[illegible]	[illegible]	6
7	358	30		50	22	44.4	114	41.0	1529	25	1949	1824	8	10.4	165		206	217	[illegible]	[illegible]/10.2	7
8	358	30		50	22	44.5	114	40.7	1525	25	1953	1826	9	10.7	165		211	223	5.4/11.8	5.5/11.8	8
9	357	30		44	22	44.6	114	41.1	[illegible]	25	1950	1824	13	11.3	[illegible]		214	225	5.1/10	[illegible]	9
10	[illegible]	30		46	22	44.5	[illegible]	45.0	1527	25	1953	1826	20	10.1	164		[illegible]	225	5.1/10.8	[illegible]	10
11	[illegible]	[illegible]		48	22	44.4	114	44.2	[illegible]	25	1948	[illegible]	22	8.7	158		217	229	[illegible]	[illegible]	11
12	354	30		48	22	44.4	115	42.8	15[illegible]	25	1948	[illegible]	22	10.7	160		22[illegible]	223	5.0/12.8	[illegible]	12
13	357	30	–	42	22	44.6	115.1	42.3	1575	25	1952	1820	23	8.8	158	–	21[illegible]	229	4.9/12	[illegible]	13
14	358	30		42	22	44.5	115	42.9	1573	25	1946	1826	25	8.9	157		[illegible]	221	5.0/12.6	5.7/12.6	14
15	359	30	–	34	22	44.4	115.1	42.2	1577	25	1954	1820	25	8.1	154	–	217	220	5.1/12.7	5.4/12.6	15
16	360	30	–	28	22	44.5	115.0	42.1	1577	25	1948	1826	26	8.3	155	–	217	226	5.2/12.6	5.4/12.6	16
17	361	31	–	29	22	44.4	115.0	41.7	1577	25	1952	1823	24	8.5	160	–	215	228	5.0/12.8	5.4/12.7	17
18	361	31	–	40	22	44.5	114.7	41.4	1579	25	1941	1822	23	8.3	155	–	214	226	4.8/12.1	4.8/12.1	18
19	363	30	–	41	22	44.6	115.0	41.1	1580	25	1946	1822	21	8.3	155	–	211	224	5.2/12.7	5.2/12.6	19
20	361	32	–	36	22	44.6	113.8	40.5	1571	25	1943	1822	23	8.1	158	–	213	226	5.2/12.8	5.2/13.7	20
21	365	32	–	32	22	44.5	114.6	40.4	1572	25	1949	1826	22	7.8	153	–	219	223	5.4/12.2	5.3/14.1	21
22	357	31	–	29	22	44.5	115.2	41.0	1527	25	1950	1828	21	8.9	157	–	210	222	5.0/12.4	5.5/13.4	22
23	[illegible]	31	–	32	22	44.5	115	42.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	22	9.8	162	–	207	218	5.2/11	5.2/1[illegible]	23
24	356	31	–	22	22	44.4	115	43.3	1528	25	[illegible]	1820	23	9.2	153	–	[illegible]	225	5.1/[illegible]	5.2/14	24
TOTAL																			/	/	TOTAL

HOUR	H2 Cold Gas Temp	Soot Blow Air Comp Amps		Condensate Pumps Amps			Boiler Feed Pumps Amps		Forced Draft Fan Amps		Induced Draft Fan Amps		Supht	Reheat	Supht Attemp Flow		Rht Spray
ENDING		A	B	A	B	C	A	B	A	B	A	B	Temp	Temp	A	B	Flow
1	45	–	[illegible]	–	[illegible]	53	[illegible]	[illegible]	16[illegible]	[illegible]	2[illegible]	[illegible]	[illegible]	1008	[illegible]	[illegible]	[illegible]
2	[illegible]		[illegible]	–	[illegible]	53	3[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2[illegible]	1009	1005	[illegible]	15[illegible]	58
3	45		[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	17[illegible]	16[illegible]	2[illegible]	[illegible]	[illegible]	1008	110	1[illegible]6	[illegible]
4	[illegible]									16[illegible]			[illegible]	1010		1[illegible]	22
5													[illegible]	[illegible]			
6	[illegible]												[illegible]	[illegible]	110	1[illegible]	
7	45		200		54	53	385	390	168	168	278	278	1004	1014	160	170	85
8	45		1[illegible]8		54	53	386	390	173	170	282	280	[illegible]	1014	150	170	85
9	44		200		54	53	386	390	168	166	274	274	1013	1009	120	[illegible]	6[illegible]
10	45		200		54	53	386	390	165	166	271	270	1005	1004	170	160	5[illegible]
11	45		200		54	53	386	[illegible]	[illegible]	168	274	272	997	1000	136	16[illegible]	5[illegible]
12	45		200		5[illegible]	53	381	388	16[illegible]	[illegible]	272	272	1005	1002	150	[illegible]	67
13	47	–	200	–	54	52	383	383	16[illegible]	165	271	[illegible]	1008	1003	120	160	60
14	45		200		54	53	382	[illegible]	170	161	281	288	[illegible]	1005	144	176	70
15	45	–	201	–	54	53	384	386	168	161	271	271	1005	1002	145	170	52
16	45	–	200	–	54	53	381	386	168	165	272	270	1012	1004	135	160	57
17	45	–	201	–	54	53	385	386	166	161	275	273	1004	1010	135	163	85
18	45	–	201	–	54	53	384	386	162	160	270	269	1011	1006	155	165	71
19	45	–	[illegible]	–	54	53	385	387	166	162	274	271	980	993	135	165	82
20	45	–	200	–	54	53	384	386	170	165	275	271	1003	1005	155	165	80
21	45	–	201	–	54	53	385	387	161	160	279	275	991	1001	85	155	25
22	45	–	201	–	54	53	386	386	160	160	271	270	1010	1003	125	155	41
23	[illegible]	–	200	–	5[illegible]	53	38[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1008	135	160	6[illegible]
24	45	–	1[illegible]8	–	54	53	382	387	[illegible]	[illegible]	278	278	[illegible]	1002	90	150	60
Total																	

	WATER			
	Raw	Filter	[illegible]	Fuel
	Wtr Tank	Wtr Tank	Wtr Tank	Oil
23	[illegible]	[illegible]	–	[illegible]
7	22	25		27.5
15	25	27	–	[illegible]

IN PLANT SILOS			
	23	7	15
A	F	F	F
B	F	F	F
C	F	F	F
D	F	F	F
E	[illegible]		8/15

UNIT OPERATOR

2300 0700 [illegible]
0700 1500 [illegible]
1500 2300 [illegible]

SHIFT	FURNACE SLAG CONDITION	SOOT BLOWING LOG								IK's & IR's Out of Service
		Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	
2300 - 0700		XXXX	XXXX	XXX	X X	[illegible]	XXX	XXX	X	
0700 - 1500										
1500 2300		XXXX	XXXX	XXXXX	XXXX	XXXX	XXXX	XX	X	

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HOUR ENDING	WYODAK GENERATION 87333 Gross Generation Meter	MW	15831 Auxiliary Transformer Meter	MW	[illegible] Start up Transformer Meter	MW	NET GEN MWH
1	896[illegible]	[illegible]	15861	30			[illegible]0
2	90053	360	158[illegible]	30			[illegible]30
3	90[illegible]37	[illegible]59	15921	30			[illegible]9
4	[illegible]765	358	15[illegible]1	30			328
5	[illegible]1126	[illegible]61	[illegible]981	30			[illegible]31
6	91[illegible]	[illegible]	16010	[illegible]			[illegible]33
Sub Total	[illegible]	[illegible]	179	179			1976
7	91850	362	1604[illegible]	30			332
8	92213	363	16069	29			334
9	92574	361	16099	30			331
10	92931	357	16128	29			328
11	932[illegible]0	[illegible]	16158	30			327
12	93646	356	16188	30			326
13	93996	350	16220	32			318
14	942[illegible]	346	16252	32			313
Sub Total	5[illegible]	2[illegible]	422	243			2611
15	946[illegible]	[illegible]	16285	32			320
16	[illegible]	[illegible]	16317	32			32[illegible]
17	[illegible]397	350	163[illegible]	31			319
18	[illegible]	352	16[illegible]0	32			320
19	[illegible]049	[illegible]	16[illegible]2	32			31[illegible]
20	[illegible]	[illegible]	[illegible]3	31			31[illegible]
21	[illegible]	[illegible]	1647[illegible]	32			31[illegible]
22	97[illegible]	347	16506	32			316
Sub Total	7811	2802	675	253			2549
23	97[illegible]	[illegible]7	16537	31			316
24	978[illegible]	[illegible]	16568	31			323
Day Total	8512	701	737	63			639
Pro Total							
Yr to Date							
	355						

	Net Main Xmtr	Gen Vars Out	Gen Vars In	Aux Xmtr Mvar	Start Up Mvar	ACC 1A2 MW	ACC 1B2 MW	Coal Handling
Pres	56009	0[illegible]809	[illegible]	[illegible]	579[illegible]	51605	97306	18751
Prev	[illegible]	[illegible]807	[illegible]25	[illegible]22	57919	[illegible]	97256	18740
Total	7754	108		5[illegible]	–	172	50	11
1st Mo			–		–			

	Coal Integrators A	B	C	D	E	SCALES H1	H2	
Pres	20[illegible]	56[illegible]	[illegible]658	136331	38354[illegible]	96784	66019	
Prev	[illegible]	[illegible]	[illegible]	[illegible]331	[illegible]	96784	60339	
Total	22122	28161	2[illegible]794	–	28571	–	5680	
1st Mo	11061	144805	1439.7	–	142705	–		

5420.9 5680

WYODAK
PLANT OPERATOR LOG

Day [illegible] Date [illegible] 6 85

WYODAK POWER PLANT – STATION LOG

HOUR ENDING	IND GEN	IND AUX	IND START UP	VARS	VOLTS	Brg Oil Press	Lube Oil Temp	H2 Press	EHC Press	EHC AMPS	Drum Press	Throttle Press	Ambient Air Temp	Exhaust Press	Exhaust Temp	Air Removal Temp	Cold End Temp A	B	AIR HEATER GAS IN - OUT A	B	HOUR ENDING
1	350	30	–	25	22	15	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	11	168	–	[illegible]	[illegible]	[illegible]	[illegible]	1
2	[illegible]	30	–	25	22	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	19[illegible]	[illegible]	[illegible]	[illegible]	161	–	20[illegible]	21[illegible]	51/137	55/127	2
3	35[illegible]	[illegible]	–	28	22	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	160	–	196	210	[illegible]	[illegible]	3
4	[illegible]	[illegible]	–	[illegible]	22	[illegible]					[illegible]	[illegible]	7	8.3	153		19[illegible]	210	[illegible]	[illegible]	4
5	[illegible]	[illegible]	–	32	22	[illegible]	[illegible]	13	[illegible]	[illegible]	1920	1870	[illegible]	8	155		[illegible]	[illegible]	[illegible]	[illegible]	5
6	[illegible]	30	–	[illegible]	22	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		7.5	15[illegible]	–	200	213	[illegible]	61/[illegible]	6
7	360	30		47	22	44.4	114	44.3	[illegible]	25	[illegible]	[illegible]	8	7.6	152		196	205	50/127	54/128	7
8	360	30		48	22	44.6	115	[illegible]	[illegible]	25	[illegible]	[illegible]	7	7.9	154		19[illegible]	206	53/[illegible]	55/[illegible]	8
9	360	30		40	22	44.4	115	[illegible]	[illegible]	25	[illegible]	1727	[illegible]	6.3	1[illegible]		202	216	53/[illegible]	[illegible]/140	9
10	358	30		23	22	44.6	115	42	[illegible]	25	[illegible]	173[illegible]	11	9.1	15[illegible]		20[illegible]	212	[illegible]	51/[illegible]	10
11	360	32	–	43	22	44.5	112.3	42	[illegible]	25	1726	[illegible]	[illegible]	[illegible]	141	–	201	[illegible]	54/138	57/[illegible]	11
12	350	32	–	22	22	44.5	[illegible]	41.5	[illegible]	25	[illegible]	[illegible]	[illegible]	[illegible]	164	–	202	214	52/136	58/[illegible]	12
13	356	32		24	22	44.4	115	41.5	1579	25	1920	[illegible]	[illegible]	7.3	151		[illegible]	220	[illegible]/115	[illegible]/115	13
14	[illegible]	33	–	28	22	44.4	114.8	[illegible]	157[illegible]	25	[illegible]	[illegible]	24	8.2	[illegible]		[illegible]	223	[illegible]	[illegible]	14
15	[illegible]	[illegible]	–		22	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	11	[illegible]	147	–	20[illegible]	[illegible]	[illegible]	[illegible]	15
16	332	32	–	29	22	[illegible]	114	42.0	[illegible]	[illegible]	[illegible]	[illegible]	10	8.5	156	–	20[illegible]	[illegible]	[illegible]	[illegible]	16
17	310	[illegible]	–	[illegible]	22	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	160	–	20[illegible]	[illegible]	[illegible]	[illegible]	17
18	310	32	–	22	22	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	9	20	15[illegible]	–	212	[illegible]	[illegible]	[illegible]	18
19	[illegible]	[illegible]	–	[illegible]	22	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	12	[illegible]	162	–	[illegible]	[illegible]	[illegible]	[illegible]	19
20	[illegible]	32	–	[illegible]	22	44.4	114	[illegible]	[illegible]	25	[illegible]	1720	[illegible]	[illegible]	[illegible]	–	201	[illegible]	[illegible]	[illegible]	20
21	338	32	–	40	22	44.6	112	49.8	[illegible]	25	[illegible]	[illegible]	10	8.7	[illegible]	–	20[illegible]	211	[illegible]	[illegible]	21
22	350	32	–	[illegible]	22	44.5	115	49.7	[illegible]	25	[illegible]	[illegible]	9	9.4	160	–	198	205	[illegible]	[illegible]	22
23	342	32	–	38	22	44.5	[illegible]	[illegible]	[illegible]	[illegible]	1925	1900	9	10	163	–	[illegible]	203	55/[illegible]	61/14	23
24	350	32	–	27	22	44.4	115	4.1	[illegible]	[illegible]	[illegible]	1900	7.2	9.5	[illegible]0	–	19[illegible]	207	[illegible]	61/[illegible]	24
TOTAL																			/	/	TOTAL

HOUR ENDING	H2 Cold Gas Temp	Soot Blow Air Comp Amps A	B	Condensate Pumps Amps A	B	C	Boiler Feed Pumps Amps A	B	Forced Draft Fan Amps A	B	Induced Draft Fan Amps A	B	Supht Temp	Reheat Temp	Supht Attemp Flow A	B	Rht Spray Flow
1	45	–	200	–	[illegible]	53	38[illegible]	386	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1[illegible]0	[illegible]
2	45	[illegible]	[illegible]	[illegible]	5[illegible]	[illegible]	[illegible]	[illegible]	165	163	[illegible]	[illegible]	[illegible]	1002	100	102	50
3	45	–	[illegible]	–	[illegible]	53	38[illegible]	[illegible]	[illegible]	[illegible]	250	[illegible]	100[illegible]	1006	120	[illegible]	90
4	45			–	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1007	90	[illegible]	[illegible]
5	45	–	200	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	100	[illegible]	[illegible]
6	[illegible]	–	[illegible]	–	[illegible]	53	38[illegible]	[illegible]	172	[illegible]0	220	210	[illegible]	999	[illegible]	[illegible]	[illegible]
7	45		208		54	53	384	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1009	1003	136	1[illegible]	50
8	45		200		54	53	385	[illegible]	[illegible]	[illegible]	278	278	[illegible]	1005	136	[illegible]	90
9	45		206		54	53	385	388	[illegible]	[illegible]	[illegible]	272	1004	998	10[illegible]	[illegible]	6[illegible]
10	45		206		54	53	384	389	[illegible]	[illegible]	[illegible]	[illegible]	1003	1011	1[illegible]0	1[illegible]	75
11	45	200	20[illegible]	–	54	53	38[illegible]	[illegible]	[illegible]	163	[illegible]	27[illegible]	1002	1007	120	150	[illegible]
12	45	200	205	–	54	53	383	385	16[illegible]	[illegible]	277	[illegible]	100[illegible]	1001	120	1[illegible]	[illegible]
13	45	1[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1003	1006	120	1[illegible]	[illegible]
14	[illegible]	[illegible]	[illegible]	–	54	[illegible]	[illegible]	[illegible]	172	[illegible]	[illegible]	30[illegible]	[illegible]	[illegible]	120	1[illegible]	[illegible]
15	[illegible]	[illegible]	20[illegible]	–	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	100[illegible]	100	[illegible]	40
16	[illegible]	[illegible]	[illegible]	–	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	10[illegible]	150	[illegible]	[illegible]
17	[illegible]	[illegible]	[illegible]	–	[illegible]	[illegible]	[illegible]	[illegible]	16[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	150	[illegible]	50
18	[illegible]	[illegible]	20[illegible]	–	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1[illegible]	[illegible]
19	[illegible]	[illegible]	[illegible]	–	[illegible]	53	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
20	[illegible]	[illegible]	[illegible]	–	[illegible]	53	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	100[illegible]	120	[illegible]	[illegible]
21	[illegible]	[illegible]	[illegible]	–	[illegible]	53	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1003	1003	120	140	40
22	[illegible]	[illegible]	20[illegible]	–	[illegible]	53	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	10[illegible]	100[illegible]	[illegible]	1[illegible]	[illegible]
23	45	200	200	–	[illegible]	53	385	[illegible]	[illegible]	[illegible]	220	278	[illegible]	1003	1[illegible]	150	50
24	45	[illegible]	20[illegible]	–	[illegible]	53	386	390	16[illegible]	168	220	270	[illegible]	1003	100	140	52
Total																	

WATER	Raw Wtr Tank	Filter Wtr Tank	Treated Wtr Tank	Fuel Oil
23	[illegible]	[illegible]	[illegible]	
7	26	[illegible]		[illegible]
15	[illegible]	[illegible]	[illegible]	[illegible]

IN PLANT SILOS	23	7	15
A	F	F	[illegible]
B	F	F	[illegible]
C	F	F	
D	F	F	[illegible]
E	[illegible]	26	22

UNIT OPERATOR
2300 0700 [illegible]
0700 1500 [illegible]
1500 2300 [illegible]

SHIFT	FURNACE SLAG CONDITION	SOOT BLOWING LOG Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	IK's & IR's Out of Service
2300 - 0700		VX V[illegible]	V V V[illegible]	V V[illegible]	V[illegible]	V[illegible]	V[illegible]	[illegible]	X	
0700 - 1500		X XX	X XX	X XX	[illegible] X	[illegible]	X X X	[illegible] X		
1500 - 2300		VXXX	VXXX	VVX	X[illegible]Y	V+Y	X+X	X+Y	X	

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WYODAK POWER PLANT – STATION LOG

HOUR	WYODAK GENERATION						
	97845		[illegible]		68349		NET
ENDING	Gross Generation		Auxiliary Transformer		Start up Transformer		GEN
	Meter	MW	Meter	MW	Meter	MW	MWH
1	[illegible]	355	16600	32			323
2	[illegible]	354	[illegible]	[illegible]			321
3	[illegible]	360	[illegible]	[illegible]			32[illegible]
4	[illegible]	353	16615	31			[illegible]
5	[illegible]620	353	16627	32			321
6	[illegible]	351	1665[illegible]	[illegible]			320
Sub Total	[illegible]	2126	190	190			[illegible]
7	00222	352	16790	32			320
8	00676	353	16822	32			321
9	01030	354	16852	31			323
10	01389	357	16885	32			325
11	01746	359	16917	32			327
12	02100	354	16949	32			322
13	02459	359	16981	32			327
14	02815	356	17014	33			323
Sub Total	4920	2844	446	256			2588
15	03175	360	[illegible]	32			32[illegible]
16	03[illegible]6	361	17078	32			329
17	[illegible]	[illegible]	[illegible]	32			[illegible]
18	0429[illegible]	[illegible]	[illegible]	[illegible]			329
19	[illegible]	[illegible]	1711[illegible]	32			329
20	[illegible]	[illegible]	17207	33			327
21	[illegible]	[illegible]	17239	[illegible]			327
22	[illegible]	354	17271	32			322
Sub Total	[illegible]	[illegible]	703	25[illegible]			2621
23	0[illegible]761	272	17300	29			243
24	06079	114	17318	18	68353	6	
Day Total	8234	286	750	47		6	
Prv Total							
Tl to Date							

	Net Main Xmtr	Gen Vars Out	Gen Vars In	Aux Xmtr Mvar	Start Up Mvar	ACC 1A2 MW	ACC 1B2 MW	Coal Handling
Pres	63481	06025	02285	72818	57932	51955	97369	18762
Prev	56009	[illegible]	[illegible]	72214	[illegible]	51605	[illegible]	18751
Total	7472	116	0	604	13	250	57	11
1st Mo								

	Coal Integrators					SCALES		
	A	B	C	D	E	H1	H2	
Pres	730050	592581	665225	136402	410289	97462	70645	
Prev	7080[illegible]	[illegible]	[illegible]	[illegible]31	[illegible]	96784	[illegible]	
Total	22001	28128	27617	71	24798	678	4624	
1st Mo								

1100.05 1406.4 1380.85 3.55 1337.4

5302

5228.25

WYODAK
PLANT OPERATOR LOG

Day Thursday Date Feb 7, 85

HOUR	IND	IND	IND			Brg Oil	Lube Oil	H2	EHC	EHC	Drum	Throttle	Ambient	Exhaust	Exhaust	Air Removal	Cond End Temp		AIR HEATER GAS IN - OUT		HOUR
ENDING	GEN	AUX	START UP	VARS	VOLTS	Press	Temp	Press	Press	AMPS	Press	Press	Air Temp	Press	Temp	Temp	A	B	A	B	ENDING
1	[illegible]	32		31	22	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1920	[illegible]	7	10	163	—	195	209	54/142	58/142	1
2	[illegible]	[illegible]		30	22	[illegible]	115	[illegible]	[illegible]		[illegible]	[illegible]	9	9.5	[illegible]	—	[illegible]	202	54/1[illegible]	[illegible]	2
3	[illegible]	32		[illegible]	22	44.4	114.0	40.1	[illegible]	25	[illegible]	[illegible]	8	7.3	160	—	197	212	53/14[illegible]	56/142	3
4	[illegible]	32		[illegible]	[illegible]	44.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	11	168	—	[illegible]	211	51/13[illegible]	53/136	4
5	[illegible]	[illegible]		40	22	[illegible]	—	49	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	50/1[illegible]	61/[illegible]	5
6	[illegible]	[illegible]		[illegible]	[illegible]	44	[illegible]					[illegible]	11	5.9	159	[illegible]	192	210	50/14	57/14	6
7	352	32		35	22	44.4	115	43[illegible]	[illegible]	25	[illegible]	17[illegible]	10	9.6	162		197	209	57/126	[illegible]	7
8	35[illegible]	32		40	22	44.4	115	42	[illegible]	25	1522	[illegible]	11	10.5	170		197	210	58/125	55/12[illegible]	8
9	[illegible]	33		50	22	44.5	[illegible]	42.7	[illegible]	25	[illegible]	[illegible]	14	6.4	14[illegible]		[illegible]	211	49/123	[illegible]	9
10	356	32		50	22	44.5	114	42.3	[illegible]	25	[illegible]	17[illegible]	[illegible]	9.0	15[illegible]		2[illegible]	212	57/126	[illegible]/128	10
11	35[illegible]	32		[illegible]	22	44.5	114	41.9	[illegible]	25	[illegible]	1776	22	8.8	161		20[illegible]	215	51/125	56/126	11
12	[illegible]	33		35	22	44.5	114	41.5	[illegible]	25	1922	[illegible]	[illegible]	7.1	145		[illegible]	216	45/12[illegible]	[illegible]/12[illegible]	12
13	[illegible]	33		40	22	44.5	114	41.3	[illegible]	25	[illegible]	17[illegible]	24	7.7	155		[illegible]	219	50/123	[illegible]	13
14	360	33		42	22	44.4	113	40.2	[illegible]	25	[illegible]	[illegible]	26	23	15[illegible]		[illegible]	224	51/12[illegible]	51/[illegible]	14
15	360	[illegible]	—	[illegible]	22	[illegible]	110	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—	[illegible]	222	[illegible]	[illegible]	15
16	[illegible]	[illegible]		[illegible]	22		110	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—	[illegible]	222	[illegible]	[illegible]	16
17	[illegible]	[illegible]	—	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			[illegible]	[illegible]	—	[illegible]	222	[illegible]	[illegible]	17
18	362	33	—	60	22	[illegible]	114	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	96	6.6	[illegible]	—	210	222	[illegible]	[illegible]	18
19	[illegible]	32	—	[illegible]	22	44[illegible]	110	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	146	—	[illegible]	221	[illegible]	[illegible]	19
20	361	33	—	70	22	[illegible]	[illegible]	[illegible]	[illegible]	25	[illegible]	[illegible]	[illegible]	5.6	146	—	[illegible]	226	[illegible]	[illegible]	20
21	[illegible]	32	—	[illegible]	22	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	149	—	[illegible]	223	[illegible]	[illegible]	21
22	360	32	—	[illegible]	22	[illegible]	[illegible]	[illegible]	[illegible]	25	1922	[illegible]	49	5.5	156	—	[illegible]	22[illegible]	/	/	22
23																			/	/	23
24																			/	/	24
TOTAL																			/	/	TOTAL

HOUR	H2 Cold Gas Temp	Soot Blow Air Comp Amps		Condensate Pumps Amps			Boiler Feed Pumps Amps		Forced Draft Fan Amps		Induced Draft Fan Amps		Supht	Reheat	Supht Attemp Flow		Rht Spray
ENDING		A	B	A	B	C	A	B	A	B	A	B	Temp	Temp	A	B	Flow
1	45	[illegible]	[illegible]	—	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1002	[illegible]	[illegible]	—
2	[illegible]	[illegible]	22[illegible]	—	[illegible]	[illegible]	[illegible]	289	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	142	[illegible]
3	[illegible]	176	[illegible]		[illegible]	[illegible]	[illegible]	289	[illegible]	[illegible]	2[illegible]	[illegible]	978	1009	80	125	[illegible]
4	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	311	[illegible]	[illegible]	2[illegible]	[illegible]	[illegible]	1005	110	136	[illegible]
5	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	290	166	[illegible]	2[illegible]	22[illegible]	[illegible]	1001	80	120	[illegible]
6	45	[illegible]	237		[illegible]	[illegible]	38[illegible]	3[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1005	[illegible]	[illegible]	[illegible]
7	45	207	208		54	53	286	350	16[illegible]	164	278	272	1003	1003	169	[illegible]	36
8	45	200	20[illegible]		54	53	290	[illegible]	164	164	274	272	[illegible]90	996	96	160	50
9	45	196	196		54	53	2[illegible]	2[illegible]	[illegible]	16[illegible]	272	272	1003	1004	116	156	94
10	45	2[illegible]	[illegible]		54	53	284	[illegible]	170	16[illegible]	[illegible]	276	995	1004	1[illegible]	[illegible]	66
11	45	20[illegible]	20[illegible]		54	53	286	286	168	164	274	272	1004	999	11[illegible]	160	[illegible]
12	45	198	206		54	53	283	286	162	16[illegible]	[illegible]	270	1004	1004	100	140	20
13	45	198	20[illegible]		54	53	283	286	16[illegible]	1[illegible]	[illegible]	[illegible]	1003	1004	[illegible]	140	[illegible]
14	45	196	202		54	53	28[illegible]	288	17[illegible]	[illegible]	278	276	995	999	80	140	[illegible]
15	[illegible]	1[illegible]	197	—	54	53	[illegible]	[illegible]	[illegible]	[illegible]	2[illegible]	[illegible]	[illegible]	99[illegible]	[illegible]	140	[illegible]
16	45	[illegible]	[illegible]	—	54	53	380	38[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	1010	110	[illegible]	60
17		[illegible]	20[illegible]	—	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1000	110	[illegible]	[illegible]
18	[illegible]	[illegible]	[illegible]	—	[illegible]	53	3[illegible]	[illegible]	17[illegible]	170	25[illegible]	22[illegible]	[illegible]	996	85	155	30
19	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	281	[illegible]	[illegible]	1005	120	120	66
20	[illegible]	[illegible]	20[illegible]	—	[illegible]	53	38[illegible]	38[illegible]	17[illegible]	[illegible]	27[illegible]	27[illegible]	984	996	80	150	60
21		[illegible]	20[illegible]	—	[illegible]	5[illegible]	3[illegible]	38[illegible]	[illegible]	170	[illegible]	278	1003	1006	125	140	[illegible]
22													1003	1003	125	150	47
23																	
24																	
Total																	

	WATER			
	Raw Wtr Tank	Filter Wtr Tank	T[illegible] Wtr Tank	Fuel Oil
23	[illegible]	15	—	[illegible]
7	23	27.5		[illegible]
15	[illegible]	[illegible]		

IN PLANT SILOS			
	23	7	15
A	F	F	F
B	F	F	F
C	F	16	[illegible]
D	F	F	[illegible]
E	↓18	↓20	↓[illegible]

UNIT OPERATOR	
2300 0700	[illegible]
0700 1500	[illegible]
1500 2300	[illegible]

SHIFT	FURNACE SLAG CONDITION	SOOT BLOWING LOG								IK's & IR's Out of Service
		Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	
2300 - 0700		XXXX	XX	✓	[illegible]	X	X	XX	[illegible]	[illegible]
0700 - 1500		X								
1500 - 2300		✓	X			✓	[illegible]	✓	✓	

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FORM NO 3198 9 80

	WYODAK GENERATION						
HOUR	06073		17318		68355		NET
ENDING	Gross Generation		Auxiliary Transformer		Start up Transformer		GEN
	Meter	MW	Meter	MW	Meter	MW	MWH
1					68374	19	
2					68392	18	
3					68409	17	
4					68425	16	
5					68440	15	
6					68453	13	
Sub Total					98	98	
7					68466	13	
8					68477	11	
9					68483	6	
10					68488	5	
11					68494	6	
12					68499	5	
13					68502	3	
14					68505	3	
Sub Total					150	52	
15					68509	4	
16					12	3	
17					15	3	
18					18	3	
19					22	4	
20					26	4	
21					31	5	
22					68535	4	
Sub Total					180	30	
23					68547	12	
24					68561	14	
Day Total					206	26	
Prv Total							
Tl to Date							

	Net Main Xmtr	Gen Vars Out	Gen Vars In	Aux Xmtr Mvar	Start Up Mvar	ACC 1A2 MW	ACC 1B2 MW	Coal Handling
Pres	63481	06025	02285	72818	58085	51855	97363	18776
Prev	63481	06025	02285	72918	57932	51855	97363	18762
Total	0	0	0	0	153	0	0	14
1st Mo								

	Coal Integrators					SCALES		
	A	B	C	D	E	H1	H2	
Pres	230058	592561	665275	136402	410288	97463	71177	
Prev	232220	592561	665275	136402	410278	97462	70643	
Total	8	0	0	0	0	1	534	
1st Mo								

.9

WYODAK
PLANT OPERATOR LOG

Day Fri Date 2-8-85

WYODAK POWER PLANT – STATION LOG

HOUR	IND	IND	IND			Brg Oil	Lube Oil	H_2	EHC	EHC	Drum	Throttle	Ambient	Exhaust	Exhaust	Air Removal	Cond End Temp		AIR HEATER GAS IN - OUT		HOUR
ENDING	GEN	AUX	START UP	VARS	VOLTS	Press	Temp	Press	Press	AMPS	Press	Press	Air Temp	Press	Temp	Temp	A	B	A	B	ENDING
1																			/	/	1
2																			/	/	2
3																			/	/	3
4																			/	/	4
5																			/	/	5
6																			/	/	6
7																			/	/	7
8																			/	/	8
9																			/	/	9
10																			/	/	10
11																			/	/	11
12																			/	/	12
13																			/	/	13
14																			/	/	14
15																			/	/	15
16																			/	/	16
17																			/	/	17
18																			/	/	18
19																			/	/	19
20																			/	/	20
21																			/	/	21
22																			/	/	22
23																			/	/	23
24																			/	/	24
TOTAL																			/	/	TOTAL

HOUR	H2 Cold Gas Temp	Soot Blow Air Comp Amps		Condensate Pumps Amps			Boiler Feed Pumps Amps		Forced Draft Fan Amps		Induced Draft Fan Amps		Supht	Reheat	Supht Attemp Flow		Rht Spray
ENDING		A	B	A	B	C	A	B	A	B	A	B	Temp	Temp	A	B	Flow
1																	
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	
11																	
12																	
13																	
14																	
15																	
16																	
17																	
18																	
19																	
20																	
21																	
22																	
23																	
24																	
Total																	

	WATER			
	Raw	Filter	Treated	Fuel
	Wtr Tank	Wtr Tank	Wtr Tank	Oil
23	22.5	27	—	[illegible]
7	21	[illegible]		[illegible]
15	21	[illegible]		[illegible]

	IN PLANT SILOS			
	23	7	15	
A				
B				
C				
D				
E				

UNIT OPERATOR	
2300 0700	[illegible]
0700 1500	[illegible]
1500 2300	[illegible]

SHIFT	FURNACE SLAG CONDITION	SOOT BLOWING LOG								IK's & IR's Out of Service
		Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	
2300 - 0700										
0700 - 1500										
1500 2300										

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FORM NO 3198 9 80

WYODAK POWER PLANT – STATION LOG

HOUR	WYODAK GENERATION						
HOUR	06079		17318		68561		NET
ENDING	Gross Generation		Auxiliary Transformer		Start-up Transformer		GEN
	Meter	MW	Meter	MW	Meter	MW	MWH
1					68576	15	
2					68592	16	
3					68611	19	
4					68630	19	
5					68648	18	
6					68667	19	
Sub Total					106	106	
7					68687	20	
8					68705	18	
9					68723	18	
10					68742	19	
11					68761	19	
12					68780	19	
13					68798	18	
14					68815	17	
Sub Total					254	148	
15					[illegible]	17	
16					68851	19	
17					69	18	
18					86	17	
19	06084	5			905	19	-14
20	06126	42	17324	6	68918	13	23
21	06238	112	17349	25			92
22	06408	16[illegible]	17375	26			139
Sub Total	324	339	57	57	357	103	
23	06581	173	17402	27			146
24	06751	170	17428	26			144
Day Total	672	343	110	53	357		290
Prv Total							
Tl to Date							

	Net Main Xmtr	Gen Vars Out	Gen Vars In	Aux Xmtr Mvar	Start Up Mvar	ACC 1A2 MW	ACC 1B2 MW	Coal Handling
Pres	69037	06028	02285	72908	59361	51933	97567	18781
Prev	63481	06025	02235	72818	58[illegible]5	51835	97363	18776
Total								5
1st Mo								

	Coal Integrators					SCALES		
	A	B	C	D	E	H1	H2	
Pres	733524	596980	665275	136402	410288	97643	71177	
Prev	730058	592561	665275	136402	410288	97463	71177	
Total	3866	4419	0	0	0	180	0	
1st Mo								

193.3 220.95

414.25

WYODAK
PLANT OPERATOR LOG

Day Sat Date 2-9-85

70-71-72

4763

HOUR ENDING	IND GEN	IND AUX	IND START UP	VARS	VOLTS	Brg Oil Press	Lube Oil Temp	H2 Press	EHC Press	EHC AMPS	Drum Press	Throttle Press	Ambient Air Temp	Exhaust Press	Exhaust Temp	Air Removal Temp	Cold End Temp A	Cold End Temp B	AIR HEATER GAS IN - OUT A	AIR HEATER GAS IN - OUT B	HOUR ENDING
1																			/	/	1
2																			/	/	2
3																			/	/	3
4																			/	/	4
5																			/	/	5
6																			/	/	6
7																			/	/	7
8																			/	/	8
9																			/	/	9
10																			/	/	10
11																			/	/	11
12																			/	/	12
13																			/	/	13
14																			/	/	14
15																			/	/	15
16																			/	/	16
17																			/	/	17
18																			/	/	18
19																			/	/	19
20																			/	/	20
21																			/	/	21
22																			/	/	22
23																			/	/	23
24																			/	/	24
TOTAL																			/	/	TOTAL

HOUR ENDING	H2 Cold Gas Temp	Soot Blow Air Comp Amps A	Soot Blow Air Comp Amps B	Condensate Pumps Amps A	Condensate Pumps Amps B	Condensate Pumps Amps C	Boiler Feed Pumps Amps A	Boiler Feed Pumps Amps B	Forced Draft Fan Amps A	Forced Draft Fan Amps B	Induced Draft Fan Amps A	Induced Draft Fan Amps B	Supht Temp	Reheat Temp	Supht Attemp Flow A	Supht Attemp Flow B	Rht Spray Flow
1																	
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	
11																	
12																	
13																	
14																	
15																	
16																	
17																	
18																	
19																	
20																	
21																	
22																	
23																	
24																	
Total																	

	WATER			
	Raw Wtr Tank	Filtered Wtr Tank	Treated Wtr Tank	Fuel Oil
23	21.5	27	—	[illegible]
7	23.5	22.5		[illegible]
15	22.3	21	—	24

	IN PLANT SILOS		
	23	7	15
A	F	F	/
B	F	E	/
C	F	E	/
D	F	F	/
E	45'	45	/

UNIT OPERATOR	
2300 0700	Thorne
0700 1500	Axlin
1500 2300	[illegible]

SHIFT	FURNACE SLAG CONDITION	SOOT BLOWING LOG								IK's & IR's Out of Service
		Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	
2300 - 0700										
0700 - 1500										
1500 2300										

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[redacted]

WYODAK GENERATION

HOUR ENDING	06751 Gross Generation Meter	Gross Generation MW	17428 Auxiliary Transformer Meter	Auxiliary Transformer MW	68918 Start-up Transformer Meter	Start-up Transformer MW	NET GEN MWH
1	06917	166	17455	27			139
2	07083	168	17481	26			142
3	07260	175	17508	27			148
4	07477	217	17536	28			189
5	07801	324	17568	32			292
6	08161	360	17598	30			330
Sub Total	1410	1410	170	170			1240
7	08520	359	17628	30			329
8	08877	357	17658	30			327
9	09237	360	17687	29			331
10	09601	364	17716	29			335
11	09963	362	17746	30			332
12	10324	361	17776	30			331
13	10686	362	[illegible]	30			[illegible]
14	11047	361	17836	30			331
Sub Total	4296	[illegible]	408	238			2648
15	[illegible]	357	17866	30			327
16	11762	358	[illegible]	[illegible]			328
17	[illegible]	[illegible]	[illegible]	30			[illegible]
18	[illegible]	[illegible]	[illegible]	30			337
19	[illegible]	363	[illegible]	30			333
20	[illegible]	364	18016	30			334
21	13575	[illegible]	[illegible]	30			330
22	[illegible]	362	[illegible]	29			333
Sub Total	7186	2880	647	239			[illegible]
23	14297	360	18105	30			330
24	14659	362	18134	29			323
Day Total	7908	722	706	59			7202
Prv Total							
Tl to Date							
	361.11Lw						

	Net Main Xmtr	Gen Vars Out	Gen Vars In	Aux Xmtr Mvar	Start Up Mvar	ACC 1A2 MW	ACC 1B2 MW	Coal Handling
Pres	71218	06110	02285	73991	50361	52173	97429	18784
Prev	64037	06028	02285	73108	58261	51933	97367	18781
Total	7181	82	0	583	0	240	62	3
1st Mo								

	Coal Integrators A	Coal Integrators B	Coal Integrators C	Coal Integrators D	Coal Integrators E	SCALES H1	SCALES H2	
Pres	255506	625828	688861	136402	432858	02140	71182	
Prev	[illegible]	[illegible]	[illegible]	136402	410288	97643	71177	
Total	21582	28848	23586	0	22570	5497	5	
1st Mo								

1079.1 1442.4 1175.3 0 1128.5 5502

4829.3

WYODAK
PLANT OPERATOR LOG

Day Sun. Date 2-10-85

WYODAK POWER PLANT — STATION LOG

HOUR ENDING	IND GEN	IND AUX	IND START UP	VARS	VOLTS	Brg Oil Press	Lube Oil Temp	H2 Press	EHC Press	EHC AMPS	Drum Press	Throttle Press	Ambient Air Temp	Exhaust Press	Exhaust Temp	Air Removal Temp	Cold End Temp A	Cold End Temp B	Air Heater Gas In - Out A	Air Heater Gas In - Out B	HOUR ENDING
1	168	28	—	-13	21.8	44.4	115.1	42.4	1573	25	1324	1855	20	5.4	140	—	118	148	2.0/12.4	2.9/17.6	1
2	166	28	—	8	22	44.5	114.9	41.9	1571	25	1945	1211	19	7.7	150	—	118	129	2.9/12.6	3.1/12.8	2
3																			/	/	3
4																			/	/	4
5	355	31	—	19	22	44.5	114.7	40.9	1568	25	1945	1821	17	6.3	144	—	155	168	4.6/12.0	4.9/12.0	5
6	361	31	—	21	22	44.4	114.7	40.6	1567	25	1964	1833	21	7.5	151	—	158	171	4.7/12.2	5.0/12.4	6
7	360	31		24	22	44.4	115	40.3	1566	25	1945	[illegible]	16	7.3	[illegible]		155	168	4.6/12.0	4.7/12.2	7
8	360	31		24	22	44.4	115	40.0	[illegible]	25	1946	1822	16	5.1	177		[illegible]	[illegible]	4.6/12.0	4.5/12.0	8
9	360	31		40	22	44.3	114	45.0	1564	25	1949	1821	17	7.3	[illegible]		158	192	4.5/12.6	4.5/12.6	9
10	366	31		60	22	44.5	115	44.1	[illegible]	25	[illegible]	[illegible]	19	5.5	[illegible]		153	[illegible]	4.8/12.6	5.1/12.6	10
11	[illegible]	31		45	22	44.4	114	43.5	1567	25	[illegible]	1822	23	[illegible]	143		[illegible]	[illegible]	4.7/12.6	4.9/12.4	11
12	[illegible]	31		40	22	44.4	115	42.9	1567	25	[illegible]	[illegible]	23	[illegible]	[illegible]		[illegible]	[illegible]	4.5/12.6	5.1/12.7	12
13	[illegible]	31		40	22	44.4	115	42.8	1566	25	[illegible]	1821	25	7.7	[illegible]		[illegible]	186	4.7/12.6	5.0/12.6	13
14	[illegible]	[illegible]		22	22	44.4	[illegible]	41.9	[illegible]	25	[illegible]	[illegible]	[illegible]	[illegible]	141		178	[illegible]	[illegible]	[illegible]	14
15	[illegible]	[illegible]		[illegible]	22	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	15
16	[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	37	[illegible]	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	16
17	[illegible]	32		22	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	17
18	360	31		[illegible]	22	[illegible]	[illegible]	[illegible]	[illegible]	25	[illegible]	[illegible]	35	[illegible]	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	18
19	[illegible]	[illegible]		39	22	[illegible]	114	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	6.6	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	19
20	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	37	7.0	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	20
21	[illegible]	30		37	[illegible]	[illegible]	114	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—	[illegible]	[illegible]	/	/	21
22		31				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1816	26	6.3	142	—	[illegible]	[illegible]	[illegible]	[illegible]	22
23	362	31	—	21	22	44.4	115.3	41.3	1567	25	1953	1824	22	8.4	155	—	184	181	4.5/13.1	5.1/13.1	23
24	361	31	—	21	22	44.3	115.6	41.0	1570	25	1953	1824	26	7.3	150	—	191	181	5.1/13.5	5.6/13.4	24
TOTAL																			/	/	TOTAL

HOUR ENDING	H2 Cold Gas Temp	Soot Blow Air Comp Amps A	Soot Blow Air Comp Amps B	Condensate Pumps Amps A	Condensate Pumps Amps B	Condensate Pumps Amps C	Boiler Feed Pumps Amps A	Boiler Feed Pumps Amps B	Forced Draft Fan Amps A	Forced Draft Fan Amps B	Induced Draft Fan Amps A	Induced Draft Fan Amps B	Supht Temp	Reheat Temp	Supht Attemp Flow A	Supht Attemp Flow B	Rht Spray Flow
1	45	200	205	—	46	49	305	320	140	140	251	250	1009	927	15	80	—
2	45	180	204	—	48	48	307	320	140	140	250	250	1008	978	—	40	—
3													997	1001			
4																	
5	45	—	200	—	55	54	379	385	155	155	261	260	997	1001	95	120	15
6	45	—	201	—	55	54	381	386	156	157	264	263	1001	999	75	100	41
7	45		200		55	54	380	[illegible]	156	156	263	262	1005	1005	[illegible]	116	30
8	45		200		55	54	[illegible]	[illegible]	156	156	263	262	1006	1005	[illegible]	116	30
9	45		200		55	54	[illegible]	[illegible]	156	[illegible]	260	264	1007	998	96	116	20
10	45		196		54	53	380	384	156	156	260	260	1007	1008	[illegible]	[illegible]	55
11	45		[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	260	264	1004	[illegible]	96	110	30
12	45		[illegible]		54	52	380	[illegible]	156	[illegible]	264	264	[illegible]	[illegible]	120	120	30
13	45		[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	265	269	996	[illegible]	[illegible]	[illegible]	40
14			200		54	[illegible]	[illegible]	[illegible]	167	160	270	270	996	[illegible]	[illegible]	[illegible]	[illegible]
15			[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
16	[illegible]		[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
17	[illegible]		[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
18	[illegible]	—	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
19	[illegible]	—	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	996	[illegible]	100	[illegible]	[illegible]
20	[illegible]		[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	160	265	[illegible]	1001	998	110	[illegible]	[illegible]
21	[illegible]	—	[illegible]		[illegible]	52	[illegible]	[illegible]	156	[illegible]	[illegible]	262	[illegible]	1001	[illegible]	[illegible]	[illegible]
22	[illegible]		[illegible]	56	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	64
23	45	—	207	56	53	—	376	383	161	166	270	272	1003	1002	105	150	45
24	45	—	204	56	53	—	374	380	160	161	269	270	1002	1002	90	145	38
Total																	

WATER	Raw Wtr Tank	Filter Wtr Tank	Treated Wtr Tank	Fuel Oil
23	21	28	—	345
7	[illegible]	[illegible]	—	22
15				

IN PLANT SILOS	23	7	15
A	+12	F	[illegible]
B	+11	F	[illegible]
C	F	F	[illegible]
D	F	[illegible]	[illegible]
E	F	+17	16

UNIT OPERATOR
2300 0700 Thorne
0700 1500 [illegible]
1500 2300 [illegible]

SHIFT	FURNACE SLAG CONDITION	SOOT BLOWING LOG Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	IK's & IR's Out of Service
2300 - 0700										
0700 - 1500										
1500 - 2300		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXX	X	

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WYODAK GENERATION

HOUR ENDING	Gross Generation 14659 Meter	MW	Auxiliary Transformer 18124 Meter	MW	Start-up Transformer 68918 Meter	MW	NET GEN MWH
1	15020	361	18164	30			331
2	15380	360	18194	30			330
3	15741	361	18224	30			331
4	16102	361	18253	29			332
5	16464	362	18283	30			332
6	16825	361	18313	30			331
Sub Total	2166	2166	179	179			1987
7	17190	365	18343	30			335
8	17549	359	18373	30			329
9	17910	361	18403	30			331
10	18267	359	18433	30			329
11	18628	359	18463	30			329
12	18991	363	18493	30			333
13	19356	365	18523	30			335
14	19717	361	18552	29			332
Sub Total	5058	2892	418	239			2653
15	20078	361	18582	30			[illegible]
16	[illegible]	365	18612	30			335
17	20807	364	18642	30			334
18	21170	363	18672	30			333
19	[illegible]36	366	18702	30			336
20	21898	362	18732	30			332
21	22258	360	18761	29			331
22	22621	363	18791	30			333
Sub Total	7862	2904	657	239			2665
23	22983	362	18821	30			332
24	23346	363	18850	29			334
Day Total	8687	725	716	59	•		666
Pre Total							
Tl to Date							
	362 ✓						

	Net Main Xmtr	Gen Vars Out	Gen Vars In	Aux Xmtr Mvar	Start Up Mvar	ACC 1A2 MW	ACC 1B2 MW	Coal Handling
Pres	79177	06207	02285	74081	52261	52480	97505	18794
Prev	71218	[illegible]1.0	02285	73491	52261	52173	97429	18784
Total	7959	97	0	590	0	307	76	10
1st Mo								

	Coal Integrators A	B	C	D	E	SCALES H1	H2	
Pres	777621	655117	716930	136402	460637	07513	72710	
Prev	755506	625833	688861	136402	458058	03140	71182	
Total	22115	29284	28069	0	22779	4373	1528	
1st Mo								

1105.75 1464.45 1403.45 0 1388.95 5901

5362.6

WYODAK
PLANT OPERATOR LOG

Day Mon. Date 2-11-85

WYODAK POWER PLANT – STATION LOG

HOUR ENDING	IND GEN	IND AUX	IND START UP	VARS	VOLTS	Bio Oil Press	Lube Oil Temp	H2 Press	EHC Press	EHC AMPS	Drum Press	Throttle Press	Ambient Air Temp	Exhaust Press	Exhaust Temp	Air Removal Temp	Coil End Temp A	Coil End Temp B	Air Heater Gas In/Out A	Air Heater Gas In/Out B	HOUR ENDING
1	362	31	—	31	22	44.[illegible]	114.8	40.5	[illegible]	25	1947	1821	22	8.4	155	—	182	181	4.8/126	4.1/128	1
2	362	31	—	29	22	44.4	114.9	45.7	1568	25	1947	1824	27	7.4	150	—	183	183	5.0/131	5.3/13.2	2
3	362	31	—	21	22	44.5	114.8	44.7	1566	25	1950	1824	26	7.8	152	—	189	192	5.2/128	5.7/13.7	3
4	[illegible]	31	—	24	22	44.4	[illegible]	42.9	1566	25	1950	1824	25	7.7	149	—	184	188	5.1/125	5.5/12.6	4
5	361	31	—	26	22	44.4	114.8	43.3	1566	25	1950	1822	25	8.6	156	—	188	192	5.1/126	5.6/12.6	5
6	363	31	—	21	22	44.4	115.1	42.7	1567	25	[illegible]	1828	25	7.6	151	—	187	192	[illegible]	5.4/13.1	6
7	[illegible]	31	—	35	22	[illegible]	[illegible]	41.7	[illegible]	25	1951	[illegible]	22	7.5	152	—	[illegible]	[illegible]	5.0/12.0	5.0/12.4	7
8	[illegible]	31	—	38	22	[illegible]	[illegible]	41.6	1568	25	[illegible]	[illegible]	28	7.2	154	—	[illegible]	[illegible]	5.2/12.3	[illegible]/12.7	8
9	362	31	—	38	22	44.3	115.1	40.9	1568	[illegible]	1950	1822	35	7.7	150	—	192	198	4.7/126	4.8/12.7	9
10	363	31	—	39	22	44.4	115.1	42.5	1566	25	1950	1821	37	[illegible]	153	—	193	199	5.1/122	5.4/12.[illegible]	10
11	363	31	—	40	22	44.4	115.1	44.4	1566	25	1948	1821	42	7.8	153	—	195	202	4.8/132	5.4/13.4	11
12	363	31	—	31	22	44.5	115.1	43.7	1568	25	[illegible]	1822	44	7.2	150	—	196	222	5.1/128	5.6/13.0	12
13	364	31	—	48	22	46.4	115.0	42.8	1569	25	1945	1816	45	7.1	149	—	203	227	4.9/12.1	5.3/13.2	13
14	365	31	—	45	22	46.2	114.8	42.5	1568	25	1949	1821	45	7.0	148	—	203	226	[illegible]	5.1/12.8	14
15	[illegible]	31	—	[illegible]	22	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1821	[illegible]	[illegible]	152	—	[illegible]	[illegible]	[illegible]	[illegible]	15
16	[illegible]	31	—	25	22	[illegible]	[illegible]	[illegible]	[illegible]	25	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	16
17	363	[illegible]	—	29	22	[illegible]	115	[illegible]	1560	25	[illegible]	1820	42	7.3	148	—	201	227	[illegible]	[illegible]	17
18	[illegible]	31	—	37	22	[illegible]	[illegible]	40	[illegible]	25	[illegible]	[illegible]	42	7.1	147	—	200	227	[illegible]	[illegible]	18
19	367	31	—	37	22	[illegible]	115	40.3	[illegible]	25	[illegible]	1821	42	7.7	149	—	198	[illegible]	5.0/133	5.4/13.5	19
20	[illegible]	31	—	40	22	[illegible]	115	[illegible]	[illegible]	25	1946	1818	40	7.0	148	—	197	[illegible]	[illegible]	[illegible]	20
21	[illegible]	31	—	38	22	[illegible]	[illegible]	[illegible]	[illegible]	25	[illegible]	[illegible]	37	[illegible]	[illegible]	—	196	[illegible]	[illegible]	[illegible]	21
22	361	[illegible]	—	37	22	[illegible]	115	[illegible]	[illegible]	25	1953	[illegible]	37	7.2	152	—	203	229	/	/	22
23	364	31	—	20	22	44.4	115.0	43.1	1569	25	1946	1824	36	5.6	139	—	198	223	5.0/132	5.4/12.0	23
24	365	31	—	20	22	44.3	114.7	42.4	1570	25	1946	1826	34	7.3	149	—	203	229	5.0/128	5.7/13.7	24
TOTAL																			/	/	TOTAL

HOUR ENDING	H2 Cold Gas Temp	Soot Blow Air Comp Amps A	Soot Blow Air Comp Amps B	Condensate Pumps Amps A	Condensate Pumps Amps B	Condensate Pumps Amps C	Boiler Feed Pumps Amps A	Boiler Feed Pumps Amps B	Forced Draft Fan Amps A	Forced Draft Fan Amps B	Induced Draft Fan Amps A	Induced Draft Fan Amps B	Supht Temp	Reheat Temp	Supht Attemp Flow A	Supht Attemp Flow B	Rht Spray Flow
1	45	—	201	56	53	—	377	383	158	160	265	266	1000	1001	105	165	68
2	45	—	204	56	53	—	378	384	160	161	270	271	1002	1001	105	155	48
3	45	—	205	56	53	—	375	382	161	165	275	276	995	1001	95	160	25
4	45	—	206	56	52	—	374	380	160	161	272	271	1005	1003	110	155	51
5	45	—	205	56	[illegible]	—	378	384	161	164	272	273	997	1001	100	160	72
6	45	—	206	56	53	—	376	383	160	161	271	270	1011	1001	110	155	
7	45	—	205	56	[illegible]	—	[illegible]	[illegible]	161	[illegible]	272	[illegible]	1007	[illegible]	110	100	50
8	45	—	192	[illegible]	[illegible]	—	[illegible]	[illegible]	159	161	272	271	1001	[illegible]	160	170	78
9	45	—	205	56	53	—	375	[illegible]	160	160	267	267	1005	1004	80	140	80
10	45	—	202	56	53	—	379	384	159	160	268	[illegible]	1010	1010	[illegible]	160	50
11	45	—	202	56	53	—	379	383	161	162	272	271	1000	1008	120	170	80
12	45	—	202	56	53	—	375	381	174	168	280	278	994	1002	100	170	80
13	45	—	201	56	53	—	375	[illegible]	167	161	[illegible]	269	1004	998	120	110	59
14	45	—	200	56	53	—	376	381	163	162	267	268	996	991	160	170	50
15	[illegible]	—	[illegible]	56	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	268	1007	1003	[illegible]	[illegible]	[illegible]
16	45	—	201	56	53	—	[illegible]	[illegible]	[illegible]	162	[illegible]	272	996	1002	[illegible]	110	70
17	45	—	201	[illegible]	[illegible]	—	[illegible]	379	162	[illegible]	277	266	1003	1000	100	100	[illegible]
18	45	—	[illegible]	[illegible]	53	—	[illegible]	[illegible]	[illegible]	162	[illegible]	270	998	1006	[illegible]	[illegible]	[illegible]
19	45	—	201	[illegible]	[illegible]	—	[illegible]	[illegible]	162	160	270	267	1001	[illegible]	120	120	53
20	[illegible]	—	[illegible]	[illegible]	53	—	378	[illegible]	163	160	273	267	1004	991	100	160	53
21	[illegible]	—	[illegible]	[illegible]	53	—	377	384	[illegible]	[illegible]	270	[illegible]	1000	1001	115	[illegible]	53
22	45	—	201	56	5								988	991			
23	45	—	201	56	53	—	376	379	169	161	271	269	1005	1001	115	160	49
24	45	—	199	56	53	—	379	380	172	168	278	271	996	1001	100	160	68
Total																	

WATER

	Raw Wtr Tank	Filter Wtr Tank	Treated Wtr Tank	Fuel Oil
23	[illegible]	[illegible]	—	21.5
7	23	[illegible]	—	[illegible]
15	[illegible]	[illegible]	—	[illegible]

IN PLANT SILOS

	23	7	15
A	F	F	↓6
B	F	F	↓21
C	F	F	↓22
D	F	[illegible]	F
E	↓7	↓	↓25

UNIT OPERATOR

2300 0700	[illegible]
0700 1500	[illegible]
1500 2300	[illegible]

SHIFT	FURNACE SLAG CONDITION	SOOT BLOWING LOG Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	IK's & IR's Out of Service
2300 - 0700		XXXX	XXXX	XXX	XXX	XXX	XXXX	XXX	X	[illegible] #5
0700 - 1500		XXXX	XXXX	XXX	XXX	XXX	XXX	XXX	X	
1500 - 2300		XXXX	XXXX	XXX	XXX	XXXX	XXXX	XX	X	IR 12

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HOUR	WYODAK GENERATION						
HOUR	23346		18850		68918		NET
ENDING	Gross Generation		Auxiliary Transformer		Start up Transformer		GEN
	Meter	MW	Meter	MW	Meter	MW	MWH
1	23707	361	18879	29			332
2	24069	362	18909	30			332
3	24429	360	18938	29			331
4	24790	361	18967	29			332
5	25152	362	18997	30			332
6	25513	361	19026	29			332
Sub Total	2167	2167	176	176			1991
7	25874	361	19055	29			332
8	26236	362	19084	29			333
9	26598	362	19113	29			333
10	[illegible]	[illegible]	19143	30			335
11	[illegible]	364	19173	30			334
12	27691	369	19204	31			333
13	[illegible]	363	19235	31			332
14	[illegible]	365	[illegible]	30			335
Sub Total	5073	[illegible]	415	239			2667
15	[illegible]	366	[illegible]	31			335
16	[illegible]	363	19327	31			332
17	28510	[illegible]	19358	31			331
18	[illegible]	116	19368	70	68924	6	
19					68938	14	
20					68954	[illegible]	
21	658	32			68972	18	
22	[illegible]	109	19389	21	68974	2	
Sub Total	6116	1243	539	124	56	56	1163
23	30014	252	19416	27	68974	0	225
24	30369	355	19446	30			225
Day Total	7023	607	596	57	56	0	550
Prv Total							
Tl to Date							

	Net Main Xmtr	Gen Vars Out	Gen Vars In	Aux Xmtr Mvar	Start Up Mvar	ACC 1A2 MW	ACC 1B2 MW	Coal Handling
Pres	85578	06272	02285	74585	58408	52784	97592	18805
Prev	79177	06207	02285	74081	58261	52480	97505	18794
Total	6401	65	0	504	47	304	87	11
1st Mo								

	Coal Integrators					SCALES		
	A	B	C	D	E	H1	H2	
Pres	796707	679259	739230	136402	482040	11652	72962	
Prev	777621	655117	716[illegible]0	136402	460637	07513	72710	
Total	19086	24122	22300	0	21403	4139	252	
1st Mo								

954.3 1206.1 1115 0 1070.16 4391

4345.55

WYODAK
PLANT OPERATOR LOG

Day Tus Date 2-12-95

WYODAK POWER PLANT – STATION LOG

HOUR	IND	IND	IND			Brg Oil	Lube Oil	H_2	EHC	EHC	Drum	Throttle	Ambient	Exhaust	Exhaust	Air Removal	Cold End Temp		AIR HEATER GAS IN / OUT		HOUR
ENDING	GEN	AUX	START UP	VARS	VOLTS	Press	Temp	Press	Press	AMPS	Press	Press	Air Temp	Press	Temp	Temp	A	B	A	B	ENDING
1	362	31	—	31	22	44.4	115.2	41.7	1570	25	1949	1824	47	7.7	152	—	202	227	4.7/13.1	5.1/13.0	1
2	360	31	—	30	22	44.4	115.0	41.4	1570	25	1952	1824	38	8.3	154	—	199	224	4.7/12.6	4.6/12.6	2
3	362	30	—	28	22	44.7	115.0	40.9	1571	25	1944	1821	40	8.1	153	—	200	225	5.2/12.6	5.6/12.5	3
4	360	30	—	29	22	44.4	114.9	40.5	1570	25	1942	1821	40	8.5	155	—	198	223	4.8/12.9	5.3/12.0	4
5	365	30	—	29	22	44.3	115.1	43.9	1570	25	1944	1821	42	7.5	150	—	201	224	4.8/12.6	5.1/12.6	5
6	361	30	—	27	22	44.5	115.0	42.4	1572	25	[illegible]	1824	45	7.4	150	—	205	230	4.7/12.0	5.4/12.0	6
7	360	30	—	26	22	44.4	114.9	46.8	1571	[illegible]	[illegible]	[illegible]	43	7.2	149	—	[illegible]	233	5/12	4.5/12.5	7
8	[illegible]	[illegible]	—	[illegible]	22	[illegible]	114.9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	45	7.3	150	—	[illegible]	231	4.7/12	[illegible]	8
9	[illegible]	[illegible]	—	36	22	44.4	115	[illegible]	[illegible]	[illegible]	1960	1816	45	6.0	142	—	191	210	4.7/12	5.3/12	9
10	360	33	—	35	22	44.5	[illegible]	[illegible]	[illegible]	25	[illegible]	[illegible]	52	6.8	147	—	[illegible]	213	4.8/13	5.4/13	10
11	[illegible]	31	—	[illegible]	22	44.5	[illegible]	[illegible]	[illegible]	[illegible]	1943	[illegible]	55	7.2	149	—	[illegible]	214	4.7/13	5.2/13	11
12	[illegible]	31	—	27	22	[illegible]	[illegible]	44	[illegible]	[illegible]	[illegible]	[illegible]	52	5.8	142	—	[illegible]	213	[illegible]	[illegible]	12
13	359	31	—	28	22	44.4	115	43.8	1572	25	[illegible]	[illegible]	[illegible]	[illegible]	140	—	[illegible]	[illegible]	[illegible]	[illegible]	13
14	[illegible]	31	—	30	22	44.4	[illegible]	[illegible]		[illegible]	[illegible]	1817	53	6.0	[illegible]	—	[illegible]	[illegible]	4.7/12.5	4.7/12.5	14
15	[illegible]	31	—	[illegible]	22	[illegible]	114	[illegible]	[illegible]	[illegible]	[illegible]	1821	[illegible]	5.8	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	15
16	[illegible]	32		10	[illegible]	[illegible]	116	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	7.0	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	16
17	360	32	—	[illegible]	22	[illegible]	115	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	17
18		31	—	29	27														/	/	18
19																			/	/	19
20																			/	/	20
21																			/	/	21
22																			/	/	22
23																			/	/	23
24	358	31	—	29	22	44.4	114.7	45.3	1562	25	1953	1828	37	7.7	153	—	197	225	4.6/12.4	4.8/12.3	24
TOTAL																			/	/	TOTAL

HOUR	H2 Cold Gas Temp	Soot Blow Air Comp Amps		Condensate Pumps Amps			Boiler Feed Pumps Amps		Forced Draft Fan Amps		Induced Draft Fan Amps		Supht	Reheat	Supht Attemp Flow		Rht Spray
ENDING		A	B	A	B	C	A	B	A	B	A	B	Temp	Temp	A	B	Flow
1	45	—	200	56	53	—	375	381	163	161	270	269	1004	1001	115	160	48
2	45	—	201	56	53	—	375	381	162	161	269	265	1006	1003	105	160	40
3	45	—	200	56	53	—	374	381	171	165	275	271	998	999	120	170	[illegible]
4	45	—	200	56	53	—	376	381	170	161	269	266	1002	1002	115	165	[illegible]
5	45	—	200	56	53	—	378	[illegible]	172	164	274	[illegible]	998	1002	105	165	72
6	45	—	198	56	53	—	376	381	166	160	269	267	1001	1000	115	160	44
7	45	—	200	56	53	—	377	[illegible]	[illegible]	167	272	270	1000	1002	[illegible]	62	60
8	45	—	200	56	53	—	[illegible]	[illegible]	[illegible]	163	272	[illegible]	[illegible]	1008	120	160	[illegible]
9	45	—	[illegible]	56	53	—	377	382	165	162	272	270	1000	1000	110	[illegible]	40
10	[illegible]	—	[illegible]	56	53	—	[illegible]	[illegible]	[illegible]	160	[illegible]	270	1003	1001	120	[illegible]	[illegible]
11	[illegible]	—	200	[illegible]	[illegible]	—	378	384	167	164	[illegible]	270	[illegible]	998	70	155	60
12	45	—	[illegible]	56	53	—	[illegible]	382	[illegible]	160	[illegible]	267	1001	998	[illegible]	150	40
13	[illegible]	—	[illegible]	56	53	—	376	386	162	160	268	268	1008	1001	50	[illegible]	[illegible]
14	[illegible]	—	[illegible]	[illegible]	[illegible]	—	[illegible]	381	[illegible]	160	[illegible]	[illegible]	[illegible]	[illegible]	85	160	[illegible]
15	[illegible]	—	[illegible]	[illegible]	53	—	[illegible]	381	160	[illegible]	[illegible]	263	[illegible]	999	120	165	50
16	[illegible]	—	[illegible]	[illegible]	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	261	[illegible]	[illegible]	996	[illegible]	160	50
17	[illegible]	—	[illegible]	56	53	—	378	[illegible]	[illegible]	160	[illegible]	265	997	999	110	120	[illegible]
18																	
19																	
20																	
21																	
22																	
23																	
24	45	—	205	56	53	—	379	385	164	160	265	265	1003	1003	80	170	20
Total																	

WATER				
	Raw Wtr Tank	Filter Wtr Tank	Treated Wtr Tank	Fuel Oil
23	25	28	—	[illegible]
7		[illegible]	—	[illegible]
15	20	28	—	[illegible]

IN PLANT SILOS			
	23	7	15
A	F	F	[illegible]
B	F	F	[illegible]
C	F	F	F
D	F	F	F
E	↓17	↓20	↓[illegible]

UNIT OPERATOR
2300 0700 Thorne
0700 1500 [illegible]
1500 2300 [illegible]

SHIFT	FURNACE SLAG CONDITION	SOOT BLOWING LOG								IK's & IR's Out of Service
		Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	
2300 - 0700		XXXX	XXXX	XXXX	XXX	XXXX	XXXX	XX	X	IK 12
0700 - 1500		XXXXX	XXXXX	XXX	XX	XX	XX	XX		IR [illegible]
1500 - 2300		XXX	XXX	XX	XX	XX	XX	XX		

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FORM NO 3198 ? 80

WYODAK GENERATION

HOUR ENDING	30761 Gross Generation Meter	MW	19446 Auxiliary Transformer Meter	MW	68774 Start up Transformer Meter	MW	NET GEN MWH
1	30720	351	19476	30			321
2	31079	359	19506	30			329
3	31437	358	19536	30			328
4	31798	361	19566	30			331
5	32158	360	19597	31			329
6	32517	359	19627	30			329
Sub Total	2148	2148	181	181			1967
7	32876	359	19656	29			330
8	33239	363	19686	30			333
9	33596	357	19715	29			328
10	33876	280	19743	28			252
11	34150	274	19770	27			247
12	34417	269	19797	27			242
13	34612	273	19825	28			245
14	34970	278	19852	27			251
Sub Total	4601	2453	406	225			
15	35320	350	19882	30			320
16	35681	361	19913	31			330
17	36047	366	19943	30			336
18	36413	366	19973	30			336
19	36778	365	20003	30			335
20	37141	363	20033	30			333
21	37504	363	20063	30			333
22	37870	366	20093	30			336
Sub Total	7501	2900	647	241			2659
23	38235	365	20123	30			335
24	38599	364	20153	30			334
Day Total	8230	729	707	60			669
Prv Total							
Yr to Date							

	Net Main Xmtr	Gen Vars Out	Gen Vars In	Aux Xmtr Mvar	Start Up Mvar	ACC 1A2 MW	ACC 1B2 MW	Coal Handling
Pres	93088	06351	02285	75164	58408	53102	97654	18815
Prev	85578	06272	02285	74585	58408	52784	97592	18805
Total	7510	79	0	579	0	318	62	10
1st Mo								

	Coal Integrators A	B	C	D	E	SCALES H1	H2	
Pres	817697	707045	765902	136402	508561	11652	78641	
Prev	796707	679[illegible]	73[illegible]0	[illegible]	482040	11652	72962	
Total	20990	27864	26672	0	26521	0	5679	
1st Mo								

1049.5 1390.3 1333.6 0 1326.05

5099.45

WYODAK
PLANT OPERATOR LOG

Day wed. Date 2-13-85

wt stm line

WYODAK POWER PLANT – STATION LOG

HOUR ENDING	IND GEN	IND AUX	IND START UP	VARS	VOLTS	Brg Oil Press	Lube Oil Temp	H_2 Press	EHC Press	EHC AMPS	Drum Press	Throttle Press	Ambient Air Temp	Exhaust Press	Exhaust Temp	Air Removal Temp	Cold End Temp A	B	AIR HEATER GAS IN / OUT A	B	HOUR ENDING
1	358	31	—	21	22	44.4	114.7	45.6	1565	25	1955	1826	36	7.3	151	—	194	221	4.6/12.0	4.6/12.0	1
2	358	31	—	31	22	44.4	115.0	45.2	1564	25	1950	1829	33	7.6	152	—	195	222	5.1/12.6	5.5/12.4	2
3	361	31	—	21	22	44.4	114.9	44.8	1569	25	1952	1826	32	7.8	153	—	192	226	4.9/12.8	5.3/12.6	3
4	360	31	—	20	22	44.4	114.8	44.4	1567	25	1953	1828	32	7.8	153	—	199	225	[illegible]	4.9/12.7	4
5	360	31	—	29	22	44.4	114.6	44.0	1566	25	1949	1824	34	6.5	146	—	195	219	4.9/12.5	5.0/12.6	5
6	362	31	—	31	22	44.5	114.8	43.7	1568	25	1952	1826	34	6.7	147	—	199	223	4.7/12.9	5.2/12.8	6
7	355	31	—	[illegible]	22	44.4	114.6	43.3	[illegible]	25	192	[illegible]	33	6.0	147	—	195	220	4.7/12.7	5.2/12.8	7
8	357	31	—	40	22	44.4	115	43.1	[illegible]	25	1953	1826	32	6.0	146	—	[illegible]	206	[illegible]	5.0/12.8	8
9	300	28	—	22	22	44.4	115	42.6	1569	25	1924	[illegible]	36	8.0	160	—	[illegible]	179	4/12.3	[illegible]	9
10	270	28	—	20	22	44.6	[illegible]	42.3	1569	25	1886	1821	38	6.9	148	—	171	183	2.2/12.3	3.2/13.3	10
11	266	29	—	18	22	44.4	[illegible]	41.9	1568	25	1886	1823	41	6.2	145	—	[illegible]	177	3.3/12.4	3.5/12.5	11
12	267	[illegible]	—	19	22	44.5	114	41.9	1567	25	1880	[illegible]	43	6.5	146	—	169	176	3.1/18.1	3.2/18.1	12
13	269	29	—	18	22	44.5	115	44.5	[illegible]	25	1885	1823	43	5.8	142	—	165	176	3.2/18.2	3.4/18.2	13
14	320	30	—	12	[illegible]	44.5	115	41.1	[illegible]	25	1917	1821	43	6.0	145	—	178	187	5/11	5/11	14
15	366	31		20	22	44.4	115	40.9	1566	25	1938	1815	44	6.4	146		190	203	5.1/13.0	5.2/13.0	15
16	362	31		18	22	44.5	115	40.6	[illegible]	24	1944	1821	44	6.3	145		190	203	4.5/12.8	5.5/12.8	16
17	364	31		20	22	44.4	114	44.4	1566	24	1948	1821	42	5.7	142		188	201	5.3/13.0	5.4/13.0	17
18	364	31		32	22	44.5	114	45.3	1567	24	1946	1818	41	5.9	142		188	200	4.9/12.8	5.3/12.6	18
19	366	31		32	22	44.4	114	44.8	1567	24	1949	1821	38	5.8	142		187	200	5.1/12.8	5.5/12.8	19
20	366	31		32	22	44.4	115	44.5	1570	24	1945	1818	32	6.5	147		186	198	4.6/12.6	5.0/12.6	20
21	362	31		30	22	44.3	115	44.2	1570	24	1941	1817	34	7.5	155		184	192	4.5/12.8	5.2/12.8	21
22																			/	/	22
23	366	37	—	11	22	44.5	115.0	43.5	1570	24	1937	1822	31	6.6	147	—	192	207	5.4/12.6	5.6/12.7	23
24	362	31	—	20	22	44.5	114.7	43.2	1564	24	1941	1817	30	7.0	149	—	185	197	5.1/12.0	5.5/13.0	24
TOTAL																			/	/	TOTAL

HOUR ENDING	H2 Cold Gas Temp	Soot Blow Air Comp Amps A	B	Condensate Pumps Amps A	B	C	Boiler Feed Pumps Amps A	B	Forced Draft Fan Amps A	B	Induced Draft Fan Amps A	B	Supht Temp	Reheat Temp	Supht Attemp Flow A	B	Rht Spray Flow
1	45	—	206	56	53	—	379	385	160	157	263	261	1004	1001	65	130	—
2	45	—	206	56	53	—	379	385	166	160	267	269	1000	1002	85	150	50
3	45	—	206	56	53	—	379	385	164	160	270	269	1005	1002	85	140	38
4	45	—	201	56	53	—	378	384	163	160	269	268	1001	1004	80	145	60
5	45	—	205	56	53	—	376	382	161	158	269	265	1006	1004	85	140	25
6	45	—	200	56	53	—	378	383	165	160	267	266	999	1002	85	150	50
7	45	—	[illegible]	56	53	—	380	[illegible]	[illegible]	158	[illegible]	266	1007	1005	85	140	25
8	[illegible]	—	208	57	53	—	379	384	160	160	270	268	[illegible]	992	80	140	40
9	45	—	203	53	49	—	380	[illegible]	[illegible]	136	240	240	1004	994	50	96	15
10	[illegible]	—	202	52	48	—	[illegible]	[illegible]	135	135	240	240	1003	973	50	90	—
11	[illegible]	—	200	52	48		[illegible]	[illegible]	[illegible]	135	240	[illegible]	996	964	50	90	—
12	45	—	[illegible]	52	48	—	340	346	[illegible]	135	240	[illegible]	1006	969	50	90	—
13	45	—	200	52	48	—	343	345	132	135	240	240	1001	929	40	90	—
14	45	[illegible]	—	55	51	—	365	365	150	150	255	255	1009	991	80	120	—
15	45	200		56	53		378	383	160	160	270	268	1001	1004	100	160	64
16	45	200		56	53		378	382	160	160	268	268	1005	1005	105	160	50
17	45	200		56	53		380	384	160	160	270	270	1004	1002	100	160	40
18	45	200		56	53		378	383	155	160	270	270	1003	1001	100	156	35
19	45	198		56	53		378	382	158	158	270	270	1005	1004	100	160	40
20	45	196		56	53		380	384	158	158	268	266	993	995	90	160	50
21	45	200		56	53		378	382	158	160	270	270	1003	1003	110	160	55
22																	
23	45	198	—	57	54	—	380	384	161	160	272	270	988	983	55	120	62
24	45	198	—	56	53	—	377	381	160	160	220	269	1008	1002	115	160	55
Total																	

WATER	Raw Wtr Tank	Filter Wtr Tank	T-[illegible] Wtr Tank	Fuel Oil
23	22	[illegible]	—	[illegible]
7	[illegible]	28	—	[illegible]
15	22.5	28		21.5

IN PLANT SILOS	23	7	15
A	F	F	F
B	F	F	F
C	F	F	F
D	F	F	F
E	619	[illegible]	6.20

UNIT OPERATOR
2300 0700
0700 1500
1500 2300

SHIFT	FURNACE SLAG CONDITION	SOOT BLOWING LOG Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	IR's & IR's Out of Service
2300 - 0700		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XX	X	5/11
0700 - 1500		XXXXX	XXXXX	X XX	X	X	X	X X	X	[illegible]
1500 - 2300		XXXX	XXXX	XXX	XXX	XXX	XXX	XX	X	

C-5
WYODAK
COAL AND ASH ANALYSIS

WYODAK COAL ANALYSIS

Date	2-1	2-2	2-3	2-4	2-5	2-6	2-7	2-9	2-10	2-11	2-12	2-13	2-14	Avg
Time	2300	1700	400	1530	1523	1010	300	2330	800	1600	434	311	500	
Ultimate (wt% dry)														
Carbon	64.36	62.34	60.90	61.75	61.94	59.52	57.07	56.60	59.77	57.73	57.65	58.50	57.1	59.63
Hydrogen	4.77	4.90	4.66	4.31	4.59	4.82	4.43	4.20	4.45	4.17	4.14	4.58	4.45	4.50
Nitrogen	.86	.80	.85	.91	.88	.84	.80	.82	.86	.84	.84	.78	.76	0.84
Sulfur	.68 .67	.98 .91	.73 .73	.37 .36	.58 .59	1.86 1.89	1.09 1.03	0.63 .60	.71 .69	.33 .31	.35 .34	1.03 .96	.67 .71	0.76
Ash (ASTM)	6.81	6.31	8.38	10.32	6.49	10.03	12.11	9.57	6.64	9.67	10.99	10.57	11.14	9.16
Ash (240B)	6.00	5.56	8.08	6.08	6.40	9.99	12.18	10.33	6.37	10.30	10.89	10.05	11.03	
CaO (wt% ash)	24.49	22.58	17.95	23.19	21.37	12.94	11.83	13.45	22.49	13.91	10.45	11.46	10.65	

WYODAK ASH SAMPLE ANALYSIS

Sample Number	925	942	945	950	982	983	002	004	005	006	930	953	940	984
Date	2/2	2/3	2/4	2/5	2/6	2/7	2/9	2/11	2/12	2/13	2/14	2/4	2/2	2/6
Type of Ash	Fly	Fly	Fly	Fly	Fly	Fly	Fly	Fly	Fly	Fly	Fly	Bottom	Bottom	Tip
Ultimate (wt% dry)														
Carbon	.08	.42	.09	.14	.07	.20	.12	.10	.15	.28	.28	.25	.37	.26
Hydrogen	.02	.02	.01	.01	.01	.01	.02	.01	.01	.02	.04	.04	.05	.01
Nitrogen	.00	.04	.02	.00	.00	.00	.02	.01	.02	.01	.00	.00	.06	.01
Sulfur	.41 .43	.36 .28	.44 .43	.47 .43	.47 .48	.44 .42	1.03 1.06	.40 .41	.37 .33	.42 .44	.40 .41	.15 .17	.09 .11	.09 .08
Ash (ASTM)	99.68	99.60	99.76	99.76	99.73	99.74	99.29	99.73	99.73	99.75	99.70	99.58	99.13	99.44
Ash (240B)	99.66	99.36	99.79	99.58	99.83	99.75	99.26	99.79	99.81	99.48	99.71	98.76	97.39	99.45
CaO (wt% ash)	19.32	17.88	18.57	18.69	17.51	16.46	21.14	17.19	17.93	18.17	17.93	11.27	11.77	8.72

PACIFIC POWER & LIGHT
COAL ANALYSIS JAN85

DAY	TONS	%MOISTURE	%ASH	%SULFUR	BTU/LB
1	5829	31.6	5.9	.51	7957
2	5740	32.2	5.2	.35	7924
3	5946	29.6	5.7	.36	8278
4	5832	30.5	5.4	.39	8011
5	5941	29.1	6.8	.28	8126
6	5398	30.5	5.9	.27	8223
7	5446	29.1	5.8	.35	8315
8	6308	30.0	6.1	.43	7941
9	5811	29.6	5.8	.34	8134
10	5934	29.3	6.1	.43	8261
11	5752	29.7	5.4	.45	8195
12	6013	29.3	5.9	.37	8119
13	5851	29.1	6.1	.42	8231
14	5725	30.8	5.5	.25	7946
15	5826	30.9	5.4	.30	7983
16	5815	30.2	5.7	.40	8081
17	5779	30.0	5.5	.39	8127
18	5888	30.2	6.1	.46	8008
19	6650	30.4	4.6	.30	8160
20	6164	30.4	5.3	.32	8066
21	5341	27.3	6.0	.40	8289
22	6560	29.3	6.4	.78	8137
23	5752	30.7	6.6	.67	7909
24	5742	30.3	6.1	.65	8081
25	5547	31.6	6.0	.40	7970
26	6105	31.8	6.4	.35	7812
27	6038	30.8	6.5	.52	7950
28	5945	29.0	8.0	.70	7982
29	5518	29.8	6.3	.64	8148
30	6044	30.5	6.3	.54	7963
31	5870	29.5	6.3	.44	8109
WEIGHTED AVERAGES	182110	30.1	6	.44	8077

cc: Plant Manager-Plant Operations-Plant Engineering
Thermal Operations Dept.-900 PSB, Resources Dept.-300 PSB

PACIFIC POWER & LIGHT
COAL ANALYSIS

FEB85

DAY	TONS	%MOISTURE	%ASH	%SULFUR	BTU/LB
1	5981	28.9	6.9	.57	8126
2	6107	29.9	6.2	.50	8131
3	6352	29.9	6.9	.56	7993
4	5980	29.5	6.3	.46	7987
5	5962	29.5	6.5	.56	8081
6	5680	29.1	6.5	.59	8123
7	5302	30.1	6.4	.62	8012
8					
9					
10	5502	29.9	6.1	.40	8028
WEIGHTED AVERAGES					
	46866	29.6	6.5	.54	8060

cc: Plant Manager-Plant Operations-Plant Engineering
Thermal Operations Dept.-900 PSB, Resources Dept.-300 PSB

[illegible]

DATE: 12-13-81

MILL NO. A

DATA TAKEN BY SSW

KW ON MILL: 400 KW

PRIMARY AIR FLOW: 55 %

7
/0

PRIMARY AIR TEMPERATURE: 816 °F

MILL OUTLET TEMPERATURE: 115 °F (175° MAX.

FEEDER SPEED: 87 %

COAL PIPES SAMPLED: 1. ☐ 2. ☐ 3. ☐
4. ☐ 5. ☐ 6. ☐

SCREEN SCALE	GRAMS ON SIEVE	% ON SIEVE	% PASSING
50	.4327	.44	99.56
100	3.2932	3.38	96.18
200	12.4772	12.82	83.36
GRAMS IN PAN	81.0992	83.36	—
TOTAL SAMPLE WT.	97.3023	100.00	

REMARKS AND COMMENTS:

PULVERIZER FINENESS

DATE: 01-16-85

MILL NO. B

DATA TAKEN BY MWM

KW ON MILL: 425 KW

PRIMARY AIR FLOW: 96 %

PRIMARY AIR TEMPERATURE: 76 °F

MILL OUTLET TEMPERATURE: 130 °F (175° MAX.)

FEEDER SPEED: 88 %

COAL PIPES SAMPLED: 1. ☐ 2. ☑ 3. ☑
4. ☑ 5. ☐ 6. ☐

SCREEN SCALE	GRAMS ON SIEVE	% ON SIEVE	% PASSING
50	.5267	.5412	99.45
100	7.0156	7.2088	92.25
200	18.3133	18.8175	73.43
GRAMS IN PAN	71.4648	73.4325	
TOTAL SAMPLE WT.	97.3204	100	

REMARKS AND COMMENTS:

PULVERIZER FINENESS

DATE: 1/16/85

MILL NO. C

DATA TAKEN BY MWM

KW ON MILL: 400 KW

PRIMARY AIR FLOW: 94 %

PRIMARY AIR TEMPERATURE: 80 °F

MILL OUTLET TEMPERATURE: 115 °F (175° MAX.)

FEEDER SPEED: 86 %

COAL PIPES SAMPLED: 1. ☐ 2. ☐ 3. ☐

4. ☐ 5. ☐ 6. ☐

SCREEN SCALE	GRAMS ON SIEVE	% ON SIEVE	% PASSING
50	.8404	.8677	99.13
100	6.6658	6.8823	92.25
200	15.9809	16.4996	75.75
GRAMS IN PAN	74.3254	75.7504	—
TOTAL SAMPLE WT.	97.8125	100	

REMARKS AND COMMENTS:

PULVERIZER FINENESS

DATE: 1/ /85

MILL NO. D

DATA TAKEN BY Mi M

KW ON MILL: 360 KW

PRIMARY AIR FLOW: 66 %

PRIMARY AIR TEMPERATURE: 76 °F

MILL OUTLET TEMPERATURE: 120 °F (175° MAX.)

FEEDER SPEED: 68 %

COAL PIPES SAMPLED: 1. ☐ 2. ☐ 3. ☐

4. ☐ 5. ☐ 6. ☐

SCREEN SCALE	GRAMS ON SIEVE	% ON SIEVE	% PASSING
50	.2664	.2767	99.72
100	5.8700	6.0969	93.63
200	24.4559	25.4012	68.23
GRAMS IN PAN	65.7262	68.2252	
TOTAL SAMPLE WT.	96.2785	100	

REMARKS AND COMMENTS:

PULVERIZER FINENESS

DATE: 1/10/85

MILL NO. E

DATA TAKEN BY MWM

KW ON MILL: 420 KW

PRIMARY AIR FLOW: 95 %

PRIMARY AIR TEMPERATURE: 80 °F

MILL OUTLET TEMPERATURE: 110 °F (175° MAX.)

FEEDER SPEED: 88 %

COAL PIPES SAMPLED: 1. ☐ 2. ☐ 3. ☐ 4. ☐ 5. ☐ 6. ☐

SCREEN SCALE	GRAMS ON SIEVE	% ON SIEVE	% PASSING
50	.2058	.2372	99.76
100	3.4900	3.5228	96.24
200	9.7348	11.2190	84.52
GRAMS IN PAN	73.3399	84.5217	–
TOTAL SAMPLE WT.	86.7705	100	

REMARKS AND COMMENTS:

C-6

WYODAK

FURNACE GAS TEMPERATURE DATA

National 42 381 50 SHEETS 5 SQUARE
42 382 100 SHEETS 5 SQUARE
42 389 200 SHEETS 5 SQUARE

FURNACE GAS TEMPERATURE DATA SHEET

DATE 2/80 LOCATION Wyodak 10th floor west, Water injected at 9½ other side of boiler

TIME	FLOOR	PORT	DEPTH	ANGLE	ΔP orifice in H2O	P vacuum in Hg	AIR TEMP °F	GAS TEMP	COMMENT	O2
1525	10th	W	3'	0	6.5	-5.5	80	610°C		4.15
			5.5'		6.5	-5.5	80	654°		4.15
			12'		6.5	-5.5	80	768 max	T/C was pulled back into sheath	4.15
1550			8'					1120	wall blowers off	4.0
1558			8'					1216	wall blowers on 2221	4.1
1602			8'					1120	avg reading same condition (1080 low)	3.75
1609			↓					1055°	1931°F	3.95
1612								1020		4.0
1615								1008	stable	4.05
1622								977	Back to IKs in S/H region (too close)	4.05
1629			↓		plugged			961	lowest temp while blowing just below	4.0

NATIONAL 42 381 50 SHEETS 5 SQUARE
42 382 100 SHEETS 5 SQUARE
42 389 200 SHEETS 5 SQUARE

FURNACE GAS TEMPERATURE DATA SHEET

DATE 2/7/85 LOCATION Wyandot

TIME	FLOOR	PORT	DEPTH	ANGLE	ΔP orifice in H₂O	P vacuum in Hg	AIR TEMP °F	GAS TEMP °C	COMMENT	O₂
10:12	10th	west	10'	0				1108	all sootblowers in boiler off	3.9
1014	↓	↓	12'	↓				1104		3.9
1016			8					1075		3.9
10:18			10'	0				1120	avg 11 ~~32~~ 50 max	3.9
10:20			10'	30°				1120	avg 1100 - 1130 IK's on at conclusion of this point	3.9
12:36	10th	west	10'	0°	6'	5.5	80	1120	1140 high were on S/H - IK's wall blowers just started 2" slag	4.0
13:45	10th	EAST	10'	0°	3	4.0	80	1250	IK just blown 4" slag	3.85
13:47			12'	0°				1256		3.85
			8'	0°				1210	1180-1220	↓
			10'	20°				1220		
			10'	0°				1210°	tip still clear	

FURNACE GAS TEMPERATURE DATA SHEET

DATE 2-11-85 LOCATION $9\frac{1}{2}$ th floor Wyodak

TIME	FLOOR	PORT	DEPTH ft	ANGLE	$\Delta P_{orifice}$ in H_2O	P_{vacuum} in Hg	AIR TEMP °F	GAS TEMP	COMMENT	O_2
1028	$9\frac{1}{2}$	W	12	0	6.0	6.5	80	1370	S/H sootblowing just completed	4.05
1029			14	0				1351-62	"	4.05
1031			20	0				1315-32	"	4.05
1034			8					1175	large tip not on when extracted	4.05
1125	$9\frac{1}{2}$	W	4					1380	just completed one cycle - max since sootblowing normally - now on A/H	4.05
1128			8					1416	tip ok	4.05
1131			12					1384		4.05
1133			14					1377		4.05
1140			20	0	3.5	3.5	80	1324		4.05
1142			16	0				1340	tip broken?	4.05
1144			16	10				1308		4.05
1147			12	10				1180	tip broken	4.2

NATIONAL 42 381 50 SHEETS 5 SQUARE
42 382 100 SHEETS 5 SQUARE
42 389 200 SHEETS 5 SQUARE

FURNACE GAS TEMPERATURE DATA SHEET

DATE 2-11-85 LOCATION Wyodak

TIME	FLOOR	PORT	DEPTH	ANGLE	$\Delta P_{orifice}$ in H_2O	P_{vacuum} in Hg	AIR TEMP °F	GAS TEMP	COMMENT	O_2
1216	9½	W	20'	0				1330	still blowing air heater - max temp expected	4.2
			20'	15				1345	max time since in furnace sootblowing	4.2
			16'					1354		4.2
			12'					1383		4.2
			8'					1402		4.2
									in-furnace sootblowing commences again	

NATIONAL 42 381 50 SHEETS 5 SQUARE
42 382 100 SHEETS 5 SQUARE
42 389 200 SHEETS 5 SQUARE

FURNACE GAS TEMPERATURE DATA SHEET

DATE 2/11/85 LOCATION

TIME	FLOOR	PORT	DEPTH	ANGLE	ΔP orifice in H₂O	P vacuum in Hg	AIR TEMP °F	GAS TEMP °C	COMMENT	O₂
1428	9½	E	20	0	6.0	6	90	1309	sootblowing in rear of S/H section	4.05
1429			16	0	6.0	6	95	1317		4.05
1432 1430			12	0	6.0	6	95	1300 1290	Slag on SH tubes about 1½" thick	4.05
1433			8	0	5.5	6	95	1320		4.05
1545	9½	E	20	0	7.0	7.0	95	1324	End of A/H blowing slag 3½"	4.15
1547			16	0	6.5	7.0		1349		4.15
1550			12	0	6.2	7.0		1330-1352		4.15
1552			8	0	5.8	8.0		1338		4.15

NATIONAL 42 381 50 SHEETS 5 SQUARE
42 382 100 SHEETS 5 SQUARE
42 389 200 SHEETS 5 SQUARE

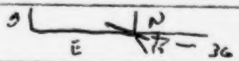
FURNACE GAS TEMPERATURE DATA SHEET

DATE 2-11-85 LOCATION Wyodak

TIME	FLOOR	PORT	DEPTH	ANGLE	ΔP orifice in H₂O	P vacuum in Hg	AIR TEMP °F	GAS TEMP	COMMENT	O₂
1623	9½	Front center	10'	see comment				1311	5" vert [illegible]" horiz · vertical angle	4.1
1627			12'					1290	16" east 75" North	4.1
1629			8'					1220-1230		4.1
			5'					1290-1320	rapid fluctuation	

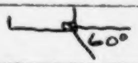
FURNACE GAS TEMPERATURE DATA SHEET

DATE 2/12 LOCATION Wyodak

TIME	FLOOR	PORT	DEPTH	ANGLE	$\Delta \dot{P}_{orifice}$ in H_2O	P_{vacuum} in Hg	AIR TEMP °F	GAS TEMP	COMMENT	
10:55	7th	SE	18'	45°	7	6.5'	90	1180	last sootblowing 9:30 ↙	3.88
11[illegible]2			5'	45°				1283	↙	3.88
13 30	7	NE	5'	45	7	6.5'	90	1453		3.68
13 34		↓	[illegible]	45	6.5	7.2		1490		3.68.
13 36			12	45	6.0	7.8		1491		3.68
			16	45'				1501		
			16	30				1490		
			16	60				1412		
			19	45				1484		

FURNACE GAS TEMPERATURE DATA SHEET

DATE 2-12-85 LOCATION Wyodak

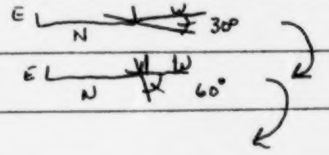
TIME	FLOOR	PORT	DEPTH	ANGLE	ΔP orifice in H₂O	P vacuum in Hg	AIR TEMP °F	GAS TEMP	COMMENT
1408	7th	NE	5'	45	7.5	6.0	90	1415	nearby IR's just blown (was 1453 earlier)
			8		6.0	6.5		1453	(1490)
			12		5.0	7.0		1474	(1451)
1415			16	45				1480	(1501)
			16	30				1469	
			16	60				1372	
1422			17	45	plugging 3.0	10.0		1446	pulled out - plugged
1427			20	45	7.0	6.0		1535	
1430			16	45	6.0	6.0		1505	
1433			16	60	6.0	6.0		1418	

3.68

3.72

FURNACE GAS TEMPERATURE DATA SHEET

DATE 2-12-85 LOCATION Wyodak

TIME	FLOOR	PORT	DEPTH	ANGLE	ΔP orifice in H₂O	P vacuum in Hg	AIR TEMP °F	GAS TEMP	COMMENT	O₂
1500	7th	NW	5'	45	4.0	3.0	80	1126	no blowing since 14:00	3.78
1504			8'	45	4	3		1179		↓
1506			8'	45	4	3		1194		
1508			12'	45	4	3		1137		
1510			16'		2.0	3.0		1207		
1512			20		2.0	3.0		1334		
1526			20		7.0	6.0		1334	~~still~~ ~~soot~~ no sootblowing yet	
			16						sootblower missed TC	
1600	7	NW	5'	45	6.5	5.0		1120	after sootblowing	
1604			20'	45	↓			1222	(was 1334) B4 sootblow	
			16	45		↓		1180-1204		
			16	30				960		
			16	60				1280		↓
			12	45	7.0	6.0		1110		3.85
			8'					1116-1130		